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Water Supplies

OUTBREAKS of water-borne diseases to which we are still subject even in so highly organised a country as Britain, inevitably focus attention upon the subject of the pollution of drinking water. It is a striking fact that amidst all the numberless standards of purity and behaviour that govern our daily life, we have no legal standard of water supply, but the matter is left to the discretion of the several water supply undertakings. In a country so densely populated and so highly industrialised as Great Britain the dangers of contamination must be proportionately high; the fact that water contamination is rare in practice is a testimony to the work of the chemists and biochemists. Dr. C. H. H. Harold in a recent paper before the British Waterworks' Association stressed the dangers that accompany the distribution of water of even slightly below the proper standards.

It may, he said, be quite true that pollutions of *B. coli* can be drunk with impunity, and that our intestinal tracts abound with these organisms, but these facts must be co-related with the method of use of these waters. They may, perhaps, be used by direct addition to cool the baby's milk or the invalid's beef-tea. If these liquids are not consumed forthwith, the poorer people will not throw them out, but will re-warm them. The result is indistinguishable from a laboratory culture, which may or may not affect the healthy adult, but is almost certain to have serious, and even fatal, effects on the invalid and the young. A single organism may become two in 20 minutes, and no less than 250,000 in six hours. The purification of domestic water supplies is initially a matter of bacterial action, but is ultimately governed by Rideal's axiom: "There is no safe method of preventing water-borne diseases except sterilisation of the liquid." A glance over the history of drinking water from its precipitation to its delivery from the tap is sufficient to indicate the extreme importance of preventing contamination of rivers by any form of polluted effluent.

Contamination of water appears to commence in the clouds, for there is known from kite observations to be a large aerial insect plankton drift at heights between 45 and 400 feet, and aeroplane investigations have shown that bacteria, pollen and moulds can be recovered at heights up to and exceeding 20,000 ft. at all seasons of the year. The descending rain also washes through air contaminated by smoke and other gaseous effluvia from towns, so that rain-water is far from being either biologically or chemically pure. The water thus precipitated reaches rivers by surface flow during which it may become dangerously contaminated, or it filters slowly through the soil to re-appear in deep wells which are usually of adequate purity.

The impurities in the surface water arise from two

sources—conditions arising within the body of the water as a whole, and external agencies. In the first of these we have the algae which also support and feed animal life or zooplankton. Algae are sometimes known to grow so rapidly in the warm water coming from condensers as to cause considerable interference in industrial plants. These algae under natural conditions grow particularly during certain seasons of the year, generally spring and autumn, and since many of them secrete essential oils, they may impart disagreeable tastes to the water. Plants of the diatom type require silicates, CO_2 and phosphates and the blue-green algae thrive upon the nitrates and phosphates of waters with higher organic content. They may be controlled by following the decrease of these substances in the water, and the water from which they have extracted the silica may give rise to industrial troubles by removing silica from zeolite filters. These plants grow both in rivers and in reservoirs, and they support insects and animalculae.

From external sources comes pollution by land washings, sewage effluents and trade waste, so that purification is essential. Much of this purification *in a healthy river* is effected by the vital carpet of the river bed, which teems with microscopic life. An unhealthy river may result from contamination with unpurified trade effluent. The organic compounds are broken down and oxygen is absorbed. In the reservoirs the water is bleached and oxygenated and considerable changes occur. Sedimentation removes the larger impurities, including bacteria; the waters are mixed so that a standard type is delivered; the harmful bacteria are devitalised and die.

If not controlled, the seasonal infestation by algae may render reservoir water nearly unusable. Here complete chemical treatment is usually applied, and it has been found that chlorinated cuprammonium or cupri-chloramine are potent algicides—particularly the latter; this compound may be applied by boat feeding of copper and ammonium sulphates at the bow and bleach at the stern, by dual gas apparatus, or from solution tanks. Sometimes coagulation with alum, or activated carbon or permanganate is necessary for taste removal. The water is then filtered, first through rough filters and then through exposed secondary filters, in which each grain of sand is encased in its gelatinous matrix and algae, zooplankton and bacteria are killed. If the water is not then of first quality, i.e., negative *B. coli* test in 100 ml it is again treated chemically with pre-formed chloramine, adequate time of contact being allowed. This brief account of the purification of the London water indicates the immense volume of scientific work which is expended upon a product for which there exists no legally defined standard of purity.

Notes and Comments

Anglo-American Trade Negotiations

BEFORE negotiations between this country and America regarding the proposed trade agreements, reach the stage at which the actual scope and terms of the agreement come under consideration, it is clearly essential that the British industries involved should be given the opportunity of stating their case to the Government. In a letter to the President of the Board of Trade, Lord Hirst, President of the Federation of British Industries, states that on several occasions it has been requested that in all cases where, in the course of trade negotiations, there is any question of a concession on our own tariff rates due notice should be given to the British industries affected. This has been done to ensure that the Government shall be in possession of the full views of the industries concerned before a concession is made. Under American procedure, the U.S. manufacturer will obtain similar information at a very early stage in the negotiations. Lord Hirst urges that organised industry in this country should likewise be given full and early opportunity of placing its views before the Government.

Persistent Rumours of Trade Slump

NO apology need be made in returning to the still persistent talk of a trade slump. It bears all the signs of a campaign as malignant as it is mysterious, and it is important to get to the bottom of it. The Stock Exchange, the indicator of general conditions, has had to bear the brunt of what can only be called defeatism, and it is frankly puzzled to understand it. There is, by all the rules, no possible reason for any recession in trade so far as Great Britain is concerned. Every indication points the other way. *The Times*, for example, gives this timely reminder:—"The Trade Returns for October showed a rise of 30 per cent. in exports, 24.9 per cent. in re-exports, and 19.3 per cent. in imports. The value of the plans for all kinds of building approved during October was practically unchanged at the high level of £8,500,000. The returns of industrial profits show an increase of about 30 per cent. over the figures for the previous year. The Revenue Returns for practically the first eight months of the current financial year show an expansion of £21,500,000 in ordinary revenue, and of nearly £3,000,000 in Post Office receipts." This country has enjoyed a brief period of rising activity. Wages have been distributed on a scale never previously reached and ought now to be coming back through the various saving mechanisms into capital investment. However the known factors in the situation are examined, it is impossible to find any evidence of a slump.

An Explanatory Theory

AN authority in the City, who was consulted this week, put forward a theory which is sufficiently well-grounded to be mentioned, however reluctantly. Politics have no place in *THE CHEMICAL AGE*. It is not part of its business to promote the interests of one party or another. It represents the trading classes, who always endeavour to carry out their share of the national work and to shoulder the national burdens, whatever may be the political complexion of the Government. The theory is that the slump scare has its origin in politics. The argument runs that the Opposition has no reasonable chance of dislodging the Government while things are

going as they are at present. Accordingly, the order has gone forth to preach the coming depression. Mr. Herbert Morrison has publicly buttressed this theory by raising another scare. He charges the Government with contemplating a General Election within the next few months. Nobody else has dreamt of giving circulation to such a palpably baseless rumour, but Mr. Morrison insists on its probability by asserting that Ministers are being haunted by the prospect of an early trade recession. Simultaneously, streams of pessimism are poured out by Mr. Morrison's associates in the House of Commons and on the public platform, notwithstanding the repeated assurances given by the Prime Minister and the Chancellor of the Exchequer that there is no public sign of any approaching depression in this country. The trading classes need not be told that the present position offers no ground for complacency. But it is necessary that they should be warned in good time against a political factor which is the more serious because there is no parallel for it. It is true that industry has long been the victim of politics and the milch-cow of governments, but an entirely new situation will arise if it is to be deliberately depressed in the supposed interests of a party conflict.

Protection from Poison Gases

THE results of a series of tests carried out by the Chemical Defence Committee with four different poison gases under gas conditions which were more severe than likely to be encountered in any war-time emergency, demonstrated that going indoors and closing doors and windows affords some measure of protection and ample time to put on the respirator, if necessary. Occupants of a room made as gas-proof as possible, as instructed in Air Raid Precautions Handbook No. 1, would normally be able to remain in complete safety and comfort without further protection. Professor W. A. Bone, however, points out in a letter to the *Manchester Guardian* that such amateur gas-proofed rooms would be rendered useless by the detonations of high-explosive bombs which would most certainly be utilised in war conditions. Another objection which might be raised is that it would require a strong-willed man to sit quietly at home with gas bombs dropping round him, even though he may realise that conditions outside are immeasurably more dangerous. The provision of some form of gas- and bomb-proof shelter would surely be more practical. In France, shelters of this type have been provided for the protection of the civil population.

Soil Surveying

AGRICULTURAL chemistry and soil science are young off-shoots of scientific investigation which have developed rapidly within recent years. Generally speaking, the soil may be altered, for example by fertilisers, to fit the requirements of some particular plant, or conversely, the plant may be selected to suit the soil as found naturally. In either case it is necessary to determine the nature and properties of the soil and the district and formation in which it is found. A soil survey manual issued by the U. S. Department of Agriculture, intended for the use of soil surveyors in the field, reflects the development of the work over the last thirty-eight years. It is a valuable and comprehensive work giving detailed information on the various stages in a survey, such as preparations for field work, preparation of the soil map, collection of soil samples, and estimation and mapping of salts or alkali in the soil.

Acicular Zinc Oxide

A Pigment for Extremely Durable Paints

IN the early part of a paper by L. O. Kekwick and A. Pass on "Acicular Zinc Oxide," presented to a meeting of the Oil and Colour Chemists' Association which was held at the Federation of British Industries, on November 26, it was pointed out that while industry has obtained incalculable advantages through the rapid advances of the science of chemistry, there is at least one disadvantage from which industry suffers, as a very elementary and direct result of the progress of a science, i.e., chemical nomenclature. Excellent as the chemical system of nomenclature may be when discussing problems in pure chemistry, there are times in the applied science when the nomenclature insufficiently describes a substance, leading not only to confusion of thought, but to definite arrest in progress. This, it was stated, is most startlingly apparent with the substance known chemically as zinc oxide. To the general chemist, zinc oxide is a substance represented by the formula ZnO , and is recognised as a white powder, insoluble in water, which will react with other chemicals in certain well-known ways. But by the paint technologist it is regarded primarily from quite a different angle. As produced to-day its chemical analysis shows a purity of over 99.9 per cent., but the properties of particular importance to the paint technologist—oil absorption, reducing power and covering power—can vary over a very wide range. The durability of two zinc oxide paints made and exposed under standard conditions can vary to such a large extent that one will exhibit breakdown by severe checking and cracking while the other will exhibit breakdown by chalking. Hence there are such fundamental differences as to be quite sufficient to warrant two entirely separate and distinct names, at least from the standpoint of the paint technologist.

Micro-Crystalline Structure

The fundamental difference in the durability of different zinc oxides was observed as long ago as 1910, and it was suggested that the differences found in two pure zinc oxides were most probably to be accounted for by differences in micro-crystalline structure. After such a paper it was astonishing to find no evidence of further work in attempting to elucidate this problem until 1935 when A.C. Eide published a paper in America. The authors suggested that the very barren intervening period is due in no small part to the fact that, to paint technologists, zinc oxide was just the chemical substance, zinc oxide, and it was a pity the zinc oxide manufacturers could not standardise their products and produce zinc oxide without all these annoying variations which cropped up from time to time to the endless worry of the man who made paint.

In 1923 Green exhibited photomicrographs of zinc oxide made by the American process which indicated that the crystals had a needle-like tendency; in other words they were acicular. The suggestion has been made that an acicular crystal is one in which the length is equal to or exceeds three times its width. The other type of zinc oxide, which has no definite crystalline shape, the authors said it would be simple to call amorphous zinc oxide, adding that the differences in durability exhibited by different zinc oxides are traceable to different methods of manufacture. The "Direct" method, such as the American process, produced zinc oxide which made durable paint, whereas the indirect method, such as the French process, produced zinc oxide which made much less durable paint. Acicular zinc oxide is a similar type to that made by the American process, but it is more fully developed and is not now necessarily made by this process. It was not until 1933 that an American patent appeared describing a process and plant for the manufacture of acicular zinc oxide. As far as the authors know, there is only one process in England which produces acicular zinc oxide and

this is described in Patent No. 391,514 of 1931, and although this process is entirely different from either the French or American process, it embodies principles from each. It is similar to the French process in that it produces zinc oxide from the metal and it resembles the American process in that the gases of combustion pass away with the zinc oxide. On the other hand, it is dissimilar from both processes in that it utilises the heat of reaction to supply its own heat requirements.

Process of Manufacture

The process consists essentially of a rotary reverberatory furnace with somewhat restricted ends forming inlet and outlet. The furnace slowly rotates and is initially charged with a bed of coke. This coke will, of course, tumble due to the rotation of the furnace. The furnace is heated by an oil burner and when at the required temperature, ingots of zinc are fed in on to the coke bed at regular intervals. The zinc then melts and is vapourised. Air is drawn through the furnace at a controlled rate, oxidising in part the zinc which has volatilised. This exothermic reaction is used to great advantage by the reverberatory nature of the furnace so that once the furnace has properly settled down, the oil burner is shut off and no further external heat is required. The process is continuous and functions for upwards of six weeks in a smoothly continuous manner, after which it requires cleaning from a slow growth of encrusted hard oxide. The zinc oxide, zinc vapour and combustion gases proceed to a secondary chamber, where more air is admitted to complete the oxidation. The zinc oxide, entrained in the gases, passes to a normal type of collection plant.

From an historical point of view, acicular zinc oxide is very young, although its antecedents can be traced back over 30 years. The first definite published work on the subject was in America by Eide and no work appears to have been done in Europe. In 1934, the authors were making microscopical examinations of a number of zinc oxides and observed the differences in particle shape. Exposures were then made by comparing the effect of particle shape on weathering and the obvious superiority of an acicular type of zinc oxide for weathering led to further investigations of manufacturing processes, the modification of an existing process and the subsequent production of an acicular zinc oxide of quite exceptional durability. All the work has been done with English makes of acicular zinc oxide, and it is pointed out that the colour is not quite such a brilliant white as that of some oxides to be obtained from the French process, but it is within the well known if rather ill-named Red Seal range. There is no doubt that with experience the colour will be further improved, but at the moment, in the English process, the more brilliant the colour the smaller the crystals and the poorer the durability. Hence a satisfactory mean has to be chosen.

Physical Characteristics

The oil absorption can be controlled, but normally it is of the same order as that of ordinary amorphous zinc oxide, viz., 16 to 18 per cent. No difference has been found in the refractive index of acicular zinc oxide as compared with ordinary amorphous zinc oxide, but the particle size is very different. Generally speaking, it is suggested that the average optimum particle size of zinc oxide is 0.75 microns, but acicular zinc oxide has considerably larger dimensions and it is this particle size and shape which confers on it its special properties. The opacity, therefore, should be less than that of amorphous zinc oxide and an approximate figure given is 5 per cent. less. This problem requires further investigation and is undoubtedly concerned with the particle shape—whether the crystals are long and narrow or short and wide. These differences must also be correlated to durability, as it

is this property which is to be developed to its greatest extent. On the other hand, the opacity of acicular zinc oxide is considerably greater than that of white lead. It is also pointed out that acicular zinc oxide makes a more mobile paint than ordinary zinc oxide, and leaves no brush marks.

Durability is the outstanding property of acicular zinc oxide, and the results of a large number of weathering tests definitely demonstrate the superior weathering properties of acicular zinc oxide over amorphous zinc oxide. Oxides with the acicular structure have been compared with the standard amorphous zinc oxides of five different English manufacturers and in no case did the life of the amorphous oxide paint approach that of the acicular. A series of lantern slides were shown giving the results of weathering after 540 days. No checking or cracking appeared on the acicular zinc oxide painted panels and it was added that the same condition applied after 780 days' exposure with 100 per cent. acicular zinc oxide. With varying proportions below 100 per cent. checking and cracking appeared according to the percentage but disappeared entirely with 100 per cent.

The superior durability of acicular zinc oxide over amorphous zinc oxide, has been found: (1) not to be due to small chemical differences; (2) not to be due to the modifications of the zinc oxide-oil reactions; (3) not to be due to some inherent property in a "Direct" produced zinc oxide; (4) not to be due to differences in particle size, without reference to particle shape; and (5) most probably due to the particle shape which enables the strains in a paint film to be relieved at the points of the crystals, thus forming a flexible film.

The durability of acicular zinc oxides can vary somewhat.

Acicular zinc oxide has a very slight tendency to chalk. It is quite as efficient as amorphous zinc oxide in reducing the chalking of white lead, but is much superior in that it prevents checking altogether. Confirmatory evidence is forthcoming from America on the subject of white-lead zinc oxide mixtures, the acicular zinc oxide producing a film substantially free from checks and cracks.

Discussion

The CHAIRMAN, Mr. A. A. DRUMMOND, said that one of the slides showed some crystals of exceptional length and it would be interesting to know whether excessive length of crystal was an advantage from the point of view of durability or whether it was better that the crystals should be more or less of the average of .75 microns, a figure which had been mentioned by the authors.

Mr. T. HEDLEY BARRY said he was extremely interested in the question of exposure for durability because there was one peculiarity in some exposure tests which rather intrigued him. There was a peculiar breakdown consisting of absolutely straight lines in the vertical and horizontal positions crossing each other, and another peculiarity was that in which the top half of such panels had been cleaned and the lower half had not. The half that had not been cleaned did not show this breakdown. It would be interesting to hear if the authors had any explanation of this peculiarity. On the question of particle size, he felt that the theory which had been developed explained to a large extent the remarkable results obtained with acicular zinc oxide.

Mr. L. O. KEKWICK, replying to the chairman on the question of particle size, said the average size of the particle in the case of acicular zinc oxide was .75 micron, and as he had indicated in the paper, the largest size of acicular zinc oxide needle was not the best for making a durable paint. There was some support for that theory. It was possible to make a durable paint with a mixture of large and small crystals, but it was necessary to avoid getting down to the fines.

The CHAIRMAN said he understood that the fines of so-called amorphous zinc oxide when examined under the microscope showed a crystal structure; was that an acicular structure?

Mr. KEKWICK said that under the microscope, amorphous zinc oxide did not show a crystal structure, and it was only possible to determine that by X-ray analysis. He could not say, however, if X-ray analysis would show whether these

Dealing with fading and tint retention: in the case of fading by chalking, any modification of the paint which prevents chalking will, obviously, also prevent fading. Panels have been exposed in the Fugitometer for investigating fading arising from the breakdown of the actual colouring matter, due in most cases to the action of a particular wave band of light. The base pigments, amorphous zinc oxide and acicular zinc oxide were compared, and the coloured pigments were lemon chrome, light Brunswick green, Prussian blue, Vermillionette; Green lake, Madder violet, Carmine, Maroon, Madder Maroon and Claret. The investigation is by no means complete, but so far as it has gone the outstanding result has been obtained with the Vermillionette. In this case, practically no fading has occurred with acicular zinc oxide, but very bad fading is shown with amorphous zinc oxide.

From the evidence available, it is stated that the following conclusions can be drawn with certainty:—

(1) Acicular zinc oxide is a pigment which, used only as a pigment, will form extremely durable paints. It should be considered by paint technologists as an independent pigment and treated as such. It does not check and crack like ordinary zinc oxide, nor chalk like white lead.

(2) Acicular zinc oxide is an extremely useful pigment when used in conjunction with other pigments. It will arrest the chalking of white lead, lithopone and titanium without creating the danger of failure by checking. It can be extended with barytes without loss of weathering properties.

(3) It is still chemical zinc oxide and, therefore, has the usual properties associated with this substance, such as its non-poisonous nature, and white colour retention in industrial atmospheres.

(4) It is possible to obtain a greater pigment concentration with acicular zinc oxide than with amorphous zinc oxide. It forms a free flowing paint and reduces brush marks to a minimum.

(5) In certain cases it shows special properties with regard to tint retention.

crystals were acicular. In reply to Mr. Hedley Barry, he said he would have liked to ask him the same question with regard to the effect mentioned. At the moment he could not explain the reason for the effect.

A SPEAKER inquired if the authors had tried heating amorphous zinc oxide to 1,200° C., with the object of finding out whether that would cause it to turn to acicular zinc oxide. Also, had they tried heating zinc carbonate or the oxide? This might throw some light on the manner in which acicular crystals formed.

Mr. A. PASS replied that both forms had been heated at various times, and it was found that the effect of heating was usually just to form crystal aggregates and there was no tendency to form acicular particles either by heating the carbonate or by heating the oxide.

Mr. W. E. WORNUM said that there were one or two points on which he did not think the authors had gone quite far enough in their paper. In the case of the acicular crystal a very different form of crystal was being dealt with, because acicularity meant that the particle was isotropic. He did not wish to go deeply into the colloidal theory, but in his own paper recently on the structure and influence of isotropic particles he had shown that from that point of view alone it was to be expected there would be a different type of structure in the paint film. But that was not all. From the point of view of the manner in which the particles grew, there was a suppressed growth along certain faces of the crystal which tended to make the particle grow needle shaped and he would think it more than likely that the activity on the particle surface that was suppressed was very much lower than in the case of what had been described as amorphous zinc oxide. Continuing, Mr. Wornum said that far too much emphasis was placed on the action of zinc oxide on the acid media. In the majority of cases it was fairly definite that where livering took place it was not the acidity of the varnish that was play-

ing a part and it was not the acidity of the medium, but what happened was that the zinc oxide was definitely active and that played a very big part in gel formation of the paint, and he did not believe that the structure of the paint was the same with acicular zinc oxide as with amorphous zinc oxide. He believed that the benefits shown by the durability trials were due to that particular point in many cases and therefore he would not entirely agree with the view that the activity of the film being reduced by the acicular form of particle was the sole explanation of this increased durability.

A SPEAKER, commenting on the difference in colour of acicular zinc oxide, compared with amorphous zinc oxide, said this meant that different materials would have to be used for indoor work from those used for outdoor work. As to the flow properties of acicular zinc oxide, the only work he had carried out had been with long oil varnish and he had found a definite tendency for decreased flow as compared with amorphous zinc oxide. It seemed that the question of flow was linked up with the type of media to a much greater extent than the authors had indicated. At the moment, acicular zinc oxide showed at a disadvantage in this respect and if it could be improved it would make the product of much greater value to the paint and varnish industry.

Reply to Questions on Activity and Colour

Mr. KEKWICK said he did not think Mr. Wornum was quite right with regard to the activity of acicular zinc oxide. A great deal of work yet remained to be done and they were not emphatic on one theory or another. All the paper aimed to do was to show what happened in certain instances with acicular zinc oxide and the advantage it could be in the industry. On the question of colour, continual efforts were being made on the manufacturing side to improve this, and he had no doubt that in due course acicular zinc oxide would be brought up to the standard of colour of White Seal amorphous zinc oxide. At the moment, however, this would not give the advantage of increased durability which was the great feature of acicular zinc oxide. It was all very well to ask for a material that could be used equally well inside and outside, but these conditions of painting involved different problems altogether and materials must be chosen which best suited the conditions to be dealt with.

Mr. R. BHATTACHARYA suggested that the colour question was linked up with the physical properties and might be affected by the presence of impurities, which might cause considerable trouble in connection with colour. Was there any difference in the percentage of cadmium present in the two types of zinc oxide?

Mr. KEKWICK said that both types of zinc oxide were made from electrolytic zinc which contained from .005 to .01 per cent. of cadmium so that the amount of cadmium present would be the same in both cases. He was very interested to hear as to the possibility that impurities might affect the colour question. That had not been brought to his notice previously and there might be something in that.

Particle Size and Pigment Properties

Mr. E. F. PARKER remarked that the paper was particularly interesting in view of the fact that at the Paint Research Station at Teddington work on somewhat similar lines was being carried out on the correlation of average particle size with pigment properties, and, of course, questions of acicularity entered into this. It had been found that care had to be taken in stating acicularity, as samples varied in a marked manner. A criterion of acicularity had been developed independently which agreed with the American statement of a major to minor axis ratio of 3:1, and it was found that the percentage acicularity of English pigment was much less than for the American. The authors had mentioned 100 per cent. acicular zinc oxide; was this to be taken as 100 per cent. pigment from the acicular-producing furnace, as no pigment had been examined at the Paint Research Station which exceeded 40 per cent. acicularity.

Mr. W. GARVIE, speaking with regard to impurities likely

to be present, said there was the possibility of nitrides being formed under the conditions in which the furnace was worked, judging from his experience of blast furnace work. It was well known, for instance, that titanium nitride was found in the crystalline form in small quantities in the inner walls of blast furnaces in a certain temperature zone and there was just the possibility of minute traces of zinc nitride being formed in a similar manner.

Mr. WOLFE expressed his interest in the statement in the paper that the oil absorption of the two types of zinc oxide was the same. He would have thought that the larger particles of the same chemical constitution in the case of acicular zinc oxide would have had a lower oil absorption, but Mr. Wornum had said that acicular chrome had a higher oil absorption. The paper pointed out that the alteration to tints was due to (a) chalking, and (b) the effect of ultra-violet light. It was also stated that acicular zinc oxide was less opaque than amorphous zinc oxide, and therefore on the second ground the amorphous zinc oxide should be better, and it should also be better on the first ground from the point of view of fading.

Mr. KEKWICK replied that as regards fading, the paper reported American results, i.e., fading due to chalking. So far as the authors were concerned they had not indicated any marked difference in chalking between the two types. Mr. Kekwick said he would not suggest there was very much difference between the two. It was the Americans who had pointed out the superiority of acicular zinc oxide when the chalking type of fading took place. With regard to fading, due to ultra-violet light, when he referred to opacity he meant the capacity for covering up the surface, and that was really due to reflected white light. This however, did not mean that zinc oxide was not opaque to ultra-violet light which seemed to cause fading in the acicular type.

Uses of Screen-Printing Process

Paper read to Society of Dyers and Colourists

A MEETING of the Manchester section of the Society of Dyers and Colourists, was held on November 19, Mr. N. Chappell, M.Sc., presiding.

The Knecht Memorial Prize of the Colour Index and Supplement was presented to Mr. Harry Smith and Mr. R. A. L. Eccles, students at the College of Technology, Manchester, and to Mr. Gerald B. Stoker, student of the Royal Technical School, Salford.

Mr. F. W. Mackenzie presented a paper on "Screen Printing." He pointed out that almost every day fresh applications and uses for the process became evident; most artists agreed that screen reproductions approached more nearly to *facsimile* of the original than was possible by any other process. Flat colour was highly suitable for screen work. The use of the process in the advertising world covered printing on wood, tin, glass, paper, leather, leather cloth, felt, and crêpe paper. By means of ingeniously designed machines milk bottles were now being printed with direct application of ceramic colours which were afterwards fired. The extent to which the process was used in regard to textiles could not be clearly stated, owing to the lack of information available.

The term "silk" in connection with screen work was now rapidly becoming somewhat ambiguous, as the material used ranged from organdie to wire mesh, continued Mr. Mackenzie. The silk which was used was actually bolting cloth, usually of Swiss or Italian origin. It was exceedingly tough and tear-resisting, and in spite of its hard wear it scored heavily over organdie from an economic point of view, as well as lasting much longer. Its value for the process was, in fact, out of all proportion to the extra cost involved. Various forms of stencils were available for use in the process. Paper stencils were very cheap and might be coated with various adhesives, such as gum arabic, dextrin, or shellac. The use of the material known as "Profilm" probably represented the greatest advance in regard to stencils; it consisted of a cellulose acetate film covered with shellac placed on a sheet of paper by means of a gutta percha coating.

The Coronation Exhibition of New Inventions

By S. C. Blacktin, M.Sc., Ph.D.

ABOUT 260 new inventions have been shown at the Coronation Exhibition of Inventions which was held at Sheffield from October 20 to 30 and at Leeds from November 10 to 20. This holding of the exhibition at large provincial industrial cities is a new departure designed to carry new inventions into districts where manufacturers are collected so as to provide possible contacts.

The following is a brief description of some of the inventions of interest, most of which are patented. The paint and varnish trades should be interested in a beeswax composition with the fatty acids removed from it, and claimed to provide a durable base for paints, varnishes, asphalt, etc. It is also said to prevent blistering and chalking, to be unaffected by temperature, and to be available also for lubricating oil for heavy duty bearings. To these, and many other industries also, a new spraying apparatus should make a particular appeal. This apparatus is claimed to work off any compressed system, and, without any pump or mechanical stirrers, to maintain the spraying mixture in a state of agitation at an adjustable, pre-determined, rate.

An exhibit described as "for separating, measuring, dispensing liquids, powders, small crystals" should interest chemical and allied industries, from the pure science laboratory to the medical dispensary. It consists of a small receptacle carried by the stopper or lid of a bottle or container which enables measured quantities to be received and poured, the quantity being adjustable. It is said that standard quantities of crystals, powders, etc., can be easily decanted into the receptacle from the bottle before being measured out for use. Collapsible boxes of any size even to the largest packing case is another invention. Claimed to be readily set up for filling, or collapsed for storage or transport when empty, the boxes are automatically locked by raising the sides and ends. There is a new device for adjusting shelf supports which can be adapted to existing shelves or fitted to new ones and allows of quick and fine adjustment. The distancing device is virtually locked when under load and cannot be accidentally moved. This should be a space-saver in laboratories.

A "Telescopic Louvre Ventilator" might be very welcome in many laboratories. It is described as giving perfect wall ventilation without draught and to be adjustable to the thickness of walls from 1 in. up. An idea which could hardly fail to be very useful is a polished and transparent material for drain pipes so that any obstruction can be seen and removed. For the textile trade a variable speed spindle control, claiming to provide constant yarn speed winding, yarn tension, and ensuring highest production per spindle yarn speed, should be of interest. It is also claimed that sloughing of smooth surface yarns when unwinding is obviated by barrel built bobbins, and that without stopping or starting of running thread, end coils are perfectly laid by micrometer adjustable thread guides.

Two different pumps exhibited should be of interest to chemical engineers. One is said to deliver up to 10,000 gallons per hour, will pump water (with its suspensions), petrol, pulp, oils, paints, etc., at low speed, and has positive action with easily renewable parts. It is of 5 in. internal diameter and 3½ in. deep. The other with a 1½ h.p. engine has 26½ ft. suction lift at an altitude of 4,700 ft., and delivers 9,000 gallons per hour. At high suction the water is raised above the cylinders allowing the pistons to give a maximum discharge on each stroke, and the pump may be operated with or without a foot valve and is self-priming. There is also a new oilskin process which can be applied to all linen, cotton, flax, and silken cloths without cracking or sticking. It is claimed to be impervious to weather and to give a fine silky, kid-like leather finish to oilskin garments. A new form of packing is known as the "pneumatic suspension packing," and it ap-

(Continued at the foot of next column.)

Atmospheric Pollution

Research Committee's Report Presented

THIRTY-SIX representatives of local authorities and other organisations co-operating with the Department of Scientific and Industrial Research held their half-yearly conference on November 30. Alderman Adams, J.P., M.P., of Newcastle, presided over the conference.

Dr. G. M. B. Dobson, F.R.S., Chairman of the Atmospheric Pollution Research Committee, presented the report on the progress of the investigations carried out under the committee. He spoke in particular of the results which were being obtained in the special survey which was in progress in and around the City of Leicester, and he illustrated his statements with sketch maps produced by the survey, which showed how dust and sulphur gases had been observed to be distributed, over a limited period, during different wind conditions. He pointed out that although the work of the survey was not yet far advanced, it was already producing interesting results about a subject concerning which exact knowledge was much needed. There was every reason to hope that the ultimate results would be of great value.

The conference discussed two sources of atmospheric pollution which occurred in certain districts. On the motion of Bailie Munro (Glasgow), the representatives of local authorities unanimously agreed to request that a letter be addressed to the Ministry of Health protesting against the continuation of nuisance arising from burning colliery spoilbanks, and urging that action be taken to end it. On the motion of Dr. Burn (Birmingham), the representatives agreed unanimously to ask the Department of Scientific and Industrial Research to consider and report on the possibility of research being undertaken to develop remedial measures to prevent nuisance caused by zinc oxide fumes in certain stages of the manufacture of brass.

Supersonic Vibrations

Applications in Industry

THE industrial applications of supersonic vibrations was the subject of a paper by Professor H. Freundlich, Ph.D., read before the Institution of Chemical Engineers on November 30.

Supersonic waves, said Professor Freundlich, are acoustic waves having a frequency of more than 15,000 cycles per second, the upper limit of audible sound waves. They can be produced by the mechanical oscillations of a piezo-electric crystal under the influence of a rapidly alternating electric field; or by the periodic contraction and extension of a ferromagnetic metal (nickel or iron) in an oscillating magnetic field. Supersonics may also be produced by purely mechanical means, for instance, by a thin jet of gas moving with a speed exceeding that of sound waves and hitting a very small cavity placed in a suitable position to the jet.

Owing to the shortness of the wave-length in supersonics, and the lively movement of small solid or liquid particles in gases, caused by them, supersonics have been applied to the degassing of liquids and for precipitating fogs and smokes. Owing mainly to the high energy they may be made to possess, supersonics have been used for emulsifying liquids, homogenising photographic emulsions, dispersing metals, producing fogs, and destroying gels.

(Continued from preceding column.)

plies where several packing rings are used together. Semi-spherical projections around the circumference of each prevents the rings from jamming together in use and forming a solid mass of rigid, inefficient, packing. This device which has been successfully marketed in the U.S.A. reduces maintenance costs and allows the production of more economical work due to the maintenance of pneumatic flexibility throughout its life.

The British Association of Chemists at Birmingham

Proceedings of the Annual General Meeting and Dinner

THE 20th Annual General Meeting of the British Association of Chemists was held at the Queen's Hotel, Birmingham, on the afternoon of November 27, the chair being taken by Dr. J. Vargas Eyre, president of the Association.

In the unavoidable absence of the honorary treasurer, Mr. W. H. Woodcock, his report was read by Mr. C. S. GARLAND, who drew attention to a feature of the report which was especially noteworthy; namely, the association's unemployment fund which was going from strength to strength. As regards the balance sheet, he said that the drop in market value of the association's investments was purely temporary and that its financial affairs were in an entirely satisfactory state.

The Council's Annual Report

Presenting the annual report of the Council, MR. A. J. C. COSBIE commented on the tribute paid by the Council to the new president. Dr. Eyre had taken the cause of the B.A.C. very much to heart and had not spared himself in becoming thoroughly and rapidly acquainted with both the organisation and its members. Although he was a very busy man, he spent a large amount of time on the activities of the association. The total membership of the B.A.C. was now 1,374, 116 new members having been elected during the year. There were 61 resignations but these were largely due to a number of members having obtained appointments as established civil servants, who must join their own association. Mr. Cosbie made a plea for individual members to help to increase the membership; the contact which members could make with their colleagues should be turned to good account. Referring to the unemployment fund, he said that this was the backbone of the association and the main object of its existence. That fund was in a sound position. Disbursements during the past year had been below average and this was mainly owing to the increase in industrial activity during the period. The appointments bureau had done very good work last year. It works in close contact with the unemployment fund, which arrangement reacts to the advantage of both members and the fund. An attempt had been made this year to extend further the scope of the appointments in the bureau's list and all committee members in every section had agreed to notify head office immediately of any vacancy in their area that may come to their notice. Mr. Cosbie said that the bureau was a useful service to members and employers alike and he wished to point this out especially to those who were in the fortunate position of being employers. As regards relations with Government departments, satisfactory contacts had been maintained with the Ministry of Labour and the offer of the Home Office Air Raid Precautions Department to arrange for lectures had been accepted by several section committees. In several cases, it had been possible to arrange for joint meetings.

Legal Aid

Dealing with the legal aid department, Mr. Cosbie said that this was another activity of the association which he would put side by side in importance with the unemployment fund. He held these two factors to be more important

to the B.A.C. than any of its other activities. The total sum of members' salaries recovered during the year without recourse to the Court was £470. All cases had been settled by negotiation and in no instance had it been necessary to commence litigation to secure recognition of the precedent of three months' salary in lieu of notice in the absence of specific agreement to the contrary.

Changes in the Association's Journal

A change in the format and cover of the *Chemical Practitioner* had recently been effected and on the question of editorial matter, Mr. Cosbie suggested that news from every section should be contained in each issue. It had been agreed that the section secretaries, or those appointed by them, should be given ample space for their news. The new format had also been designed to encourage advertisers and there was reason to believe that the revenue from advertisements would be greatly increased this year. He said that the association was on the verge of publishing a register—the first register to be issued by the B.A.C. On a point arising from the report concerning the register, Mr. C. B. Woodley, general secretary, said that 88 to 90 per cent. of the members had already signed the register (their names being published only on their consent) and every effort was being made to complete the register for publication in the near future.

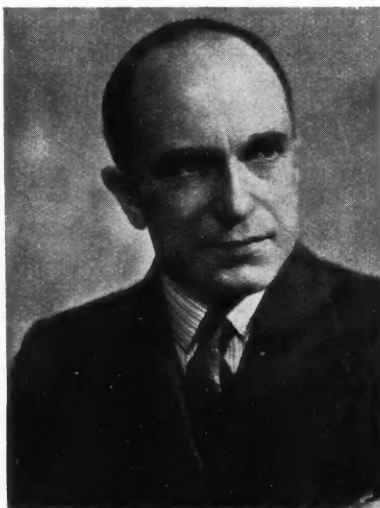
Unemployment Committee

MISS W. WRIGHT then presented the report of the Unemployment Special Purposes Committee. While there had been a prospect of heavy claims maturing in the early part of the year, subsequent events had modified or delayed a considerable portion of these for several months. Miss Wright explained that this situation had arisen owing to the liquidation of a company which might have entailed disbursements from the unemployment fund to some twenty chemists. A number of them had, however, obtained other positions and many prospective claims were thus withdrawn.

The recommendation was again made that the additional benefit after five years' subscribing membership be maintained as recommended last year, provided that the member had not been in arrears with subscription or contribution during this period. Attention was drawn by Miss Wright to this advantage to members of maintaining their subscriptions. Recommendations had also been formulated with a view to providing extended benefits to members who had subscribed for ten years without claim or arrears of subscription or contribution. Miss Wright emphasised that the whole idea of the fund was insurance against the risk of unemployment. That fund was growing very satisfactorily.

Election of Officers and Council Members

The election of officers for the ensuing year then took place. Mr. Cosbie said that it gave him very great pleasure to propose Dr. J. Vargas Eyre as president for a further year, and on seconding by Mr. C. S. Garland, this was carried with enthusiasm. Dr. Eyre made a brief reply of thanks. The other officers were then elected as follows: Vice-presidents, Mr. Wm. E. Kay, Mr. J. Bristowe P. Harrison, F.I.C., Professor



J. Vargas Eyre, M.A., Ph.D., F.I.C.,
president of the British Association of
Chemists.

I. M. Heilbron, D.S.O., F.R.S., Professor A. C. Green, M.Sc., F.I.C., F.R.S., Sir James Colquhoun Irvine, C.B.E., F.R.S., and Dr. Paul Haas, D.Sc.; honorary registrar, Professor E. C. Baly, C.B.E., F.I.C., F.R.S.; honorary treasurer, Mr. W. H. Woodcock; and honorary editor, Mr. H. T. F. Rhodes, M.E.I. The following were elected by the sections to membership of the council: London, Miss W. Wright, B.Sc., A.I.C., Mr. G. T. Gurr and Capt. R. P. Porter, B.Sc.; Liverpool, Mr. G. C. Riley, M.A., B.Sc., and Mr. C. A. Wylie; Birmingham, Mr. A. Churchman, M.Sc., A.I.C.; Manchester, Mr. J. H. Dent, B.Sc., A.I.C., Mr. W. Kay, and Mr. F. Page Evans, M.Sc., A.I.C.; Notts and Derby, Mr. R. J. Mann, B.Sc.; and Scottish, Mr. R. W. Dunlop.

Mr. C. S. GARLAND expressed the sincere thanks of the association to its officers of the past year who were so largely responsible for the success of the B.A.C. during that period. He included especially Mr. Woodley and the staff of the office who had served the association with the greatest loyalty and energy. Finally, Dr. Eyre said that he was all in favour of the provincial sections joining up with the other societies and holding joint meetings. In London, the societies were too large to do this at the moment, but by such amalgamation in the provinces an example would be set which London would have to follow eventually.

The meeting then closed.

The Annual Dinner and Dance

In the evening the association's annual dinner and dance was held at the Queen's Hotel. Dr. J. Vargas Eyre presided and the principal guests included the Bishop of Birmingham, Dr. Barnes, Sir Patrick Hannon, M.P., and Dr. Anderson, principal of the Birmingham municipal technical college.

Dr. ANDERSON, proposing the toast of "The Association," referred to the very important part which it played in the profession. It had set up a rôle of conduct which ensured fair service and a square deal. The individual man was entitled to a fair return for his services in industry and the industry was entitled to a square deal. The object of the association was to bring this about. Dr. Anderson said that he considered that the chemist and the engineer were two of the greatest factors in raising the standard of living of the world.

To take an example, the chemist had done very valuable work connected with drugs, pharmaceutical products, and the problems of nutrition. A most important branch of the industry, although small, was biochemistry and its investigations concerned with such subjects as vitamins and hormone products. The chemist was coming to the aid of the doctor, and the closer this co-operation became, the greater would be the progress made. The chemist was constantly pushing back the boundary of our knowledge and while he made many discoveries which were of the utmost benefit to mankind, such as insulin, he also made many which were to its detriment, for example, poison gas. Dr. Anderson suggested that all professional associations should consider the uses to which some of the discoveries of science are put.

The Object of the Association

Dr. J. VARGAS EYRE, replying to this toast, remarked that, as civilisation progresses, the influence of the chemist becomes more and more important and more and more appreciated by society. He thought that chemists were, in the main, an unclubbable lot of people but they liked to get along with a few chosen colleagues who had a narrow field of interest common to both. The object and aim of the British Association of Chemists was not much concerned with scientific development but with the human side of the chemist himself. Its main object was to foster the social side and professional progress from the human and individual aspect. There would be a time when the association would be very glad that it was registered as a trades' union. During negotiations over the Poisons Rules, the voice of the B.A.C.

had been heard inside the Cabinet. This had been done by personality and determination—the real spirit of the organisation. The Government unemployment scheme was to be considered shortly and the B.A.C. would have to look after the interests of the chemist in that matter. Dr. Eyre said that he had visited nearly all the sections of the association and had found a tremendous enthusiasm among their members.

The association was going to grow through that enthusiasm, and he reminded members that 10 years ago the membership was 700 while to-day it stood at nearly 2,000—a very strong indication of the success of the organisation and of the appeal which it is making. He said that it should be emphasised that 90 to 95 per cent. of the members were engaged in manufacturing processes throughout the country.

Its Functions

The functions of the association could be summarised: qualification by Deeds, the unemployment fund for cases of Distress, legal aid for cases of Doubt, and the appointments bureau for cases of Difficulty. The register should provide a very useful record for those in authority, Dr. Eyre added. It was certain that to-day the chemist in industry received more adequate remuneration than his academic brother. Attention should be drawn to this and to the work of the appointments bureau which had had another very active and successful year. In conclusion, he quoted a passage from Rabindranath Tagore which he said described in beautiful terms that need for the human touch which the association can fill: "When the weariness of the road is upon me, and the thirst of the sultry day; when the ghostly hours of the dusk throw their shadows across my life, then I cry not for your voice only, my friend, but for your touch."

Toast of the Guests

The toast of "The Guests" was proposed by Mr. A. J. C. COSBIE, who paid tributes to the Bishop of Birmingham and Sir Patrick Hannon. He said that the chemist came in for a good deal of blame at present for discoveries which had been turned to destructive uses. Scheele could not be censured for having discovered chlorine owing to its use in war. The chemist's function was merely to amass knowledge and it was not his job to see in what way that knowledge was applied subsequently. In replying to the toast, the BISHOP OF BIRMINGHAM, Dr. BARNES, remarked that the city of Birmingham could claim close association with the early days of chemistry and gave as an example, Priestley, who had carried out much of his important work there. Referring to the progress made in chemistry and metallurgy during the last century, Dr. Barnes said that this was an indication of what would happen if the continuity of development was maintained. The progress of knowledge would most certainly come to an end on the outbreak of another destructive war and already on the Continent there was nothing like that opportunity or enthusiasm for pure knowledge that existed in the years before the war.

Sir Patrick Hannon's Reply

SIR PATRICK HANNON, M.P., also made a reply on behalf of the guests and made some interesting points in his speech. He said that it was important that those who direct legislation should have expert opinion and advice available. In cases such as air raid precaution services, the advice, help and guidance of the chemical profession will be of the greatest possible assistance to the Government. He said that, as a nation, we had a tendency to be too pessimistic about the future; in reality the country was marching steadily forward. Within the last three weeks there had been a depressing attitude in London about industry. It was a fact, however, that those industries connected with the chemical profession were more healthy than at any time since 1914. The situation was due to inadvised action on behalf of those who control finance and to the manipulations of investors.

River Pollution

Final Report on Survey of River Tees

WATER Pollution Research Technical Paper No. 6, just issued by the Department of Scientific and Industrial Research, gives a detailed description of the results of a chemical and biological investigation of the non-tidal reaches of the River Tees from its source on Cross Fell in the Pennines to Yarm. This investigation, which occupied a period of about four years, formed part of a comprehensive chemical, biological and hydrographical survey of the whole of the river and its tributaries from its source to the sea.

The object of the survey was to obtain data on the effects of the various discharges of sewage and trade effluents on the river and on the extent to which these polluting liquids should be purified before discharge if serious pollution of the river water is to be avoided. In planning the work, the aim was not merely to study the conditions affecting the River Tees, but to provide basic information of value in considering problems of river pollution in general. The results of the hydrographical observations and of the chemical and biological survey of the estuary were published some time ago as Water Pollution Research Technical Papers, Nos. 2 and 5. The three reports, together, give a complete description of the survey of the whole river.

According to the present report (H.M. Stationery Office, 12s. 6d.), above Croft the water is fairly soft, its hardness ranging from the equivalent of 5 to 10 parts of calcium carbonate per 100,000 parts; normally it is slightly alkaline in character, but at times of heavy flood it may be acid with peaty water from the moorlands near the source. From the source to Middleton-in-Teesdale, about 23 miles, the river is practically unpolluted, and chemical analysis showed little variation in composition.

At Croft, the entry of the tributary river, the Skerne, causes a marked change in the chemical and biological characteristics of the Tees. The water of the Skerne is very hard and it is heavily polluted with sewage effluent from the town of Darlington. As a result the hardness of the water of the Tees at Croft is increased to between 10 and 20 parts per 100,000, and there is an increase in the quantity of organic matter in solution and in suspension.

Photographs of Atom Tracks

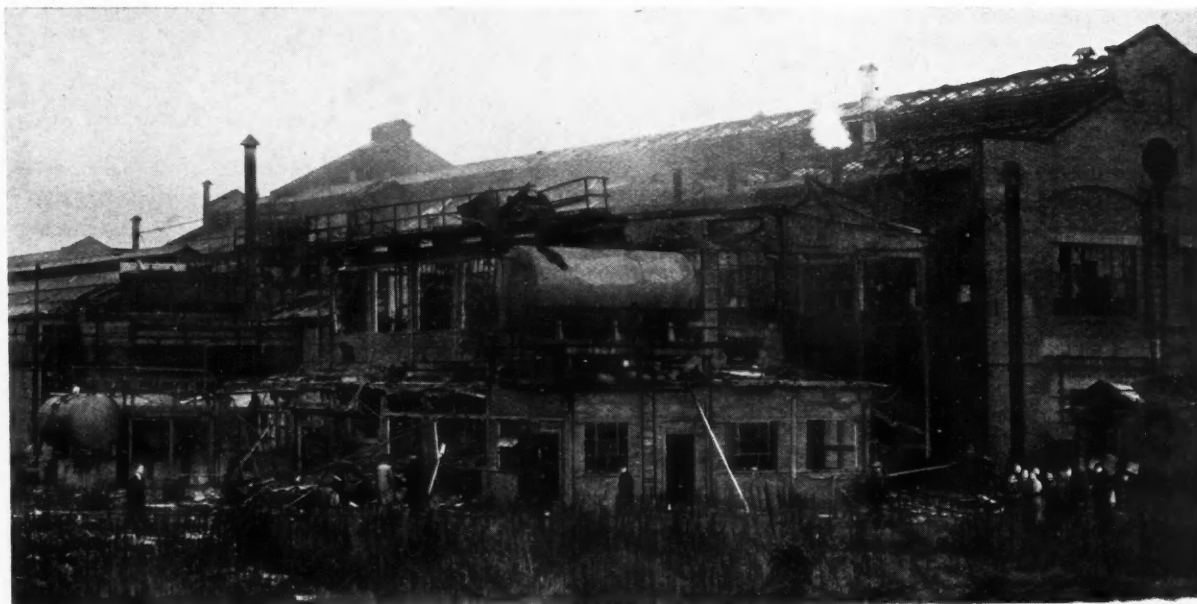
An Exhibition at the Science Museum

AN exhibition of photographs of atom tracks has been opened at the Science Museum, South Kensington. It will continue until the end of February. The exhibition has been arranged in honour of Professor C. T. R. Wilson, F.R.S., Fellow of Sidney Sussex College, and lately Jacksonian Professor of Natural Philosophy at Cambridge, and also to illustrate recent progress in atomic physics. Most of the exhibits consist of photographs of the tracks of single atoms and electrons moving at high speeds in air or other gases. A large proportion of these represents work done in the Cavendish Laboratory, Cambridge, but others come from America, France, Germany, and Russia.

It is just 25 years since Professor Wilson first succeeded in making visible the tracks of individual atoms and electrons. The essence of his method was to force water-vapour to condense momentarily along the track of the moving atom or electron, thus forming a tiny streak of cloud which could be seen and photographed. The original apparatus with which he worked is one of the exhibits in the present exhibition.

An introductory section, consisting of a few photographs specially chosen for simplicity and clarity, and of explanatory labels, expounds the elements of the subject, and is subdivided into groups relating to alpha-rays, beta-rays, and cosmic-rays. This is followed by other sections more technical in character and appealing especially to the expert. A stereoscopic apparatus enables one to see certain of the tracks in three dimensions, as they actually occur. It is believed that this is the most comprehensive collection of atom track photographs yet shown in this country. Included in it is the well-known photograph taken in 1924 by Professor P. M. S. Blackett, which showed an actual atom in collision with the nucleus of another atom and disintegrating it.

THE extraction of common salt from sea-water by a new freezing process is being tested out in an experimental plant near Gullmarsfjord, on the west coast, by the Svinska Turbinfabriks A.-B., of Finspang. The results will be awaited with considerable interest as Sweden imported 168,000 tons of common salt in 1936.



(The Yorkshire Post)

A general view after an explosion which occurred on Monday in one of the manufacturing sheds at the works of the British Dyestuffs Corporation Ltd., at Huddersfield. Three injured men were detained in hospital and there were a number of employees with minor injuries caused by flying glass. It is said that the explosion took place in a compression plant used in the production of paranitraniline.

Prolongation of Rubber Patent

Petition Dismissed

A PETITION by Dr. Philip Schidrowitz, of Chancery Lane, London, and Vultex, Ltd., of St. Helier (Jersey), for prolongation of a patent was dismissed by Mr. Justice Luxmore, sitting in the Chancery Division, on November 25. The invention related to a process useful in the manufacture of vulcanised rubber composition.

His Lordship said he had not sufficient evidence before him to explain the failure of Vultex Productions, Ltd. (started by Vultex, Ltd.) to exploit the invention commercially in 1928. The accounts submitted were not satisfactory, and the interest of Vultex, Ltd., in sub-licences granted to at least two companies had not been disclosed. He was not satisfied that there had been full disclosure of the position in regard to foreign patents. He did not suggest there had been deliberate withholding of necessary information, but there had not been that care taken in the presentation of accounts and the disclosure of material information that was required in cases of prolongation.

"The Comptroller," said his Lordship, "must rely on what is disclosed to him. He cannot be a detective. If there is relaxation in the rule, it is difficult to say what extent of negligence may be permitted or not. The disregard of the required standard of disclosure in this case is sufficient to compel me to refuse the petition."

Phenolic Resins

Water-Clear Products Not Yet Possible

AN interesting lecture on phenolic resins was recently delivered by Dr. T. Love, of Manesty Machines, Ltd., Liverpool, to the Andersonian Chemical Society at the Royal Technical College, Glasgow.

The reaction between phenol and formaldehyde, which has played such a large part in the development of the plastics industry, was first recorded by Bayer in 1872, said Dr. Love. The product obtained, however, did not appear to open up a particularly inviting line of research, so it was not until the beginning of the present century, when there was a demand for a shellac substitute, that much attention was directed to phenol formaldehyde resins. One of the most recent developments of the industry was transparent phenolic moulding powder. This material had been introduced in America, and it was claimed that transparent or translucent articles could be moulded from it. Water-clear materials have not yet proved possible, but very good tortoiseshell or mottled effects have been introduced.

After describing this production of commercial resins and the making of moulding powders, the lecture concluded with a short account of cast phenolic resins.

British Industries Fair, 1938

The following is a list of exhibitors in the Chemical Section of the British Industries Fair to be held next February:—Albright and Wilson, Ltd., Association of British Chemical Manufacturers, A. Boake Roberts and Co., Ltd., Boots Pure Drug Co., Ltd., British Drug Houses, Ltd., The British Fumigants Co., Ltd., British Industrial Solvents, Ltd., W. J. Bush and Co., Ltd., Crystal and Co., Ltd., Detel Products, Ltd., The Gas Light and Coke Co., Ltd., The General Chemical and Pharmaceutical Co., Ltd., Hopkin and Williams, Ltd., Howards and Sons, Ltd., Imperial Chemical Industries, Ltd., Johnson and Sons, Manufacturing Chemists, Ltd., Monsanto Chemicals, Ltd., Morgan Brothers (Publishers), Ltd., Newton Chambers and Co., Ltd., Powell Duffryn Associated Collieries, Ltd., Society of Chemical Industry, South Metropolitan Gas Co., David Thom and Co., Ltd., Thomas Tyrer and Co., Ltd., Whiffin and Sons, Ltd., and Williams (Hounslow), Ltd.

The Institution of Chemical Engineers

THE President's reception of the Institution of Chemical Engineers was held at the Waldorf Hotel, London, W.C.2, on November 25, when the guests were received by Dr. William Cullen, president, and Mrs. Cullen, O.B.E. Among those who accepted invitations to be present were:—The Earl of Dudley, Lord and Lady Melchett, Sir Robert and Lady Vansittart, Sir Frank and Lady Smith, Sir Harry and Lady Lindsay, Sir Robert Waley Cohen, Sir Gilbert and Lady Morgan, Sir Harold and Lady Hartley, Sir William and Lady Codling, Dr. and Mrs. E. F. Armstrong, Mr. and Mrs. S. J. Astbury, Prof. and Mrs. E. C. C. Baly, Mr. W. R. Barclay, Prof. and Mrs. H. V. A. Briscoe, Mr. W. J. A. Butterfield and Miss Butterfield, Mr. W. A. S. Calder, Dr. and Mrs. F. H. Carr, Mr. and Mrs. J. M. Cullen, Mr. W. A. Damon, Mr. M. B. Donald, Prof. and the Hon. Mrs. A. C. G. Egerton, Dr. H. J. T. Ellingham, Dr. and Mrs. J. Vargas Eyre, Dr. and Mrs. J. J. Fox, Major and Mrs. F. A. Freeth, Mr. and Mrs. F. A. Greene, Dr. and Mrs. L. A. Jordan, Dr. and Mrs. J. G. King, Dr. and Mrs. L. H. Lampitt, Dr. and Mrs. R. Lessing, Dr. and Mrs. H. Levinstein, Dr. G. Roche Lynch and Miss Roche Lynch, Mr. and Mrs. Emile Mond, Mr. and Mrs. L. P. O'Brien, Dr. and Mrs. A. Parker, Prof. and Mrs. J. C. Philip, Mr. J. F. Ronca and Miss Ronca, Prof. and Mrs. Jocelyn Thorpe, Dr. A. J. V. Underwood, and Mr. and Mrs. E. Wallace.

Ramsay Memorial Fellowships

Awards for 1937-38

THE Ramsay Memorial Fellowship trustees have made the following awards of new fellowships for the year 1937-38: Mr. Albert Ernest Alexander, a British fellowship of £300, tenable for two years, at the University of Cambridge; Mr. Thomas Picton Hughes, a British fellowship of £300, tenable for one year, at the University of Cambridge; Dr. E. de Sales, a fellowship of £300, tenable for one year, at University College, London; Dr. E. C. Stathis, a Greek fellowship, tenable at University College, London; Mr. Hazime Oosaka, a Japanese fellowship, tenable for two years, at University College, London; Dr. M. C. F. Beukers, a Netherland fellowship of £300, tenable for one year, at the Imperial College of Science and Technology, London; Dr. J. J. Hermans, a Netherland fellowship, tenable at University College, London.

The trustees have renewed for a second year the Glasgow fellowship held by Dr. R. R. Gordon at University College, London.

Letter to the Editor

Chlorinated Rubber

SIR,—With reference to the abstract of a paper by J. P. Baxter and J. G. Moore (of the I.C.I.) on the "Properties of Chlorinated Rubber," which appeared in your valuable paper on the 20th instant, page 407, may I draw your attention to the inaccurate impression that is created by the wording of paragraph 3, wherefrom it would not unreasonably be assumed, that the advent of "Detel" was subsequent to that of Allopren in 1934.

As a matter of actual fact, the original patent granted to our Technical Director, F. C. Dyche-Teague, who was the pioneer in low viscosity chlorinated rubber, dates back to 1927.—Yours faithfully,

D. E. JEANS,
Secretary, Detel Products, Ltd.

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- Reactions for distinguishing mineral oils from animal and vegetable oils. Ulrich, *Fette u. Seifen*, 44, 426.
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Cellulose, Paper

- Manufacture of chemical paper pulp. Hall, *Papier*, 40, 737-752.
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- Dyestuff adsorption of bleached cotton, artificial silk and cellulose wool. Drathen, Havekost and Ruscheweyh, *Melliand Textilber.*, 18, 915-918.
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- Electrolytic production of beryllium-copper alloys. Fink and Shen, *Metal Ind.*, 51, 533-536.
 Magnesium-aluminium alloys. McGivern and Wilkinson, *Metal Ind.*, 51, 521-525.
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- Extenders for soaps. Bauschinger, *Fette u. Seifen*, 44, 394-397.
 Manufacture of curd soaps. *Seifensieder-Ztg.*, 64, 822-824.
 Tall oil fatty acids. Niesen, *Fette u. Seifen*, 44, 426-432.
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Paints, Pigments, Resins

- Simplified method of testing paint films. Rossmann, *Angew. Chem.*, 50, 854-856.
 Oil-resin ratios in varnishes. Wolff and Zellner, *Paint Varnish Prod. Manager*, 17, No. 5, 7-10.
 Ethyl silicate. *Paint Varnish Prod. Manager*, 17, No. 5, 10-11.
 Emulsion type protective paints. Scheifele, *Farben-Ztg.*, 42, 1,139-1,141.
 Tar paints and their pigments. Stock, *Farben-Ztg.*, 42, 1,141-1,142.

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- Polyglycol maleates. Vincent, *Ind. Eng. Chem.*, 29, 1,267-1,269.
 Permeability of polysulphide resins to hydrogen. Sager, *Paint Varnish Prod. Manager*, 17, No. 5, 28-32.
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- Thermochemistry in technology. Roth, *Chem. Ztg.*, 61, 897-900.
 Deposition of scale: Occurrence, prevention, removal. Barber, *Fuel Economist*, 1937, 498-502.

The Chemistry of Food

Some Recent Developments

A SURVEY of some of the most interesting advances in the chemistry of foods show the great value of a sound knowledge particularly of organic and analytical chemistry in elucidating the constitution and properties of some of the principal food materials, said Dr. H. E. Cox when reading a paper before the Bristol Section of the Institute of Chemistry on November 18.

Our knowledge of most of the important foods has been furthered by the recognition and determination of various chemical substances present, sometimes in large and sometimes in small proportions, but upon which the peculiar properties of the foods depend, continued Dr. Cox. The advances made in the storage and transport of fruit from foreign parts has been based upon the study of the respiratory activities of fruit coupled with the recognition of the subtle changes in quantity and identity of the sugars in them and the influence of traces of unsaturated compounds such as ethylene. The more important conclusions are described. The practical value of these investigations has been enormous, and they have explained such puzzling phenomena as the influence of one fruit upon the ripening of another.

Direct chemical methods for the determination of vitamins A, C and D, have greatly facilitated the study of the production and disappearance of these vitamins and the recognition of their importance in connection with the canning of food. Study of the structural relations of vitamin A and of carotene has led to some understanding of the natural origin of vitamins and their significance. In the field of food flavours important discoveries have also been made, as substances such as diacetyl, responsible for flavour in several foods have been detected then synthesised. On the other hand, the chemistry of tannin and of tea and coffee has somewhat lagged behind; but little is known of the real constitution of the active substances in these commodities.

With regard to fats, the recent work of Hilditch and others has raised the standard from the collection of empirical data to some knowledge of the true glyceridic constituents of the fats and bids fair to provide some insight into their synthesis in animals and plants. Similarly, the advance in our knowledge of myosin and other proteins has led to appreciation of the factors underlying rigor mortis and "drip" of meat, while study of the effects of carbon dioxide on bacterial growth has resulted in the transport of thousands of tons of chilled meat from the antipodes in a manner hitherto impossible.

The development of analytical technique for the recognition of traces of metals has similarly proved of great value in assessing the true importance of traces of various elements. Thus fluorine is now known to be intensely injurious, even in quite minute quantities, whereas the absence of traces of cobalt in certain pastures results in disease of sheep; examples of the importance of traces of various substances were given.

Heavy Chemicals in India

Developments in Mysore State

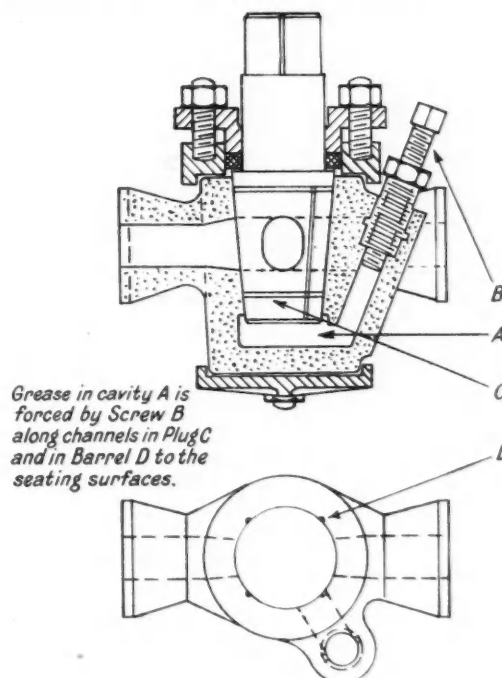
THE manufacture of ammonium sulphate and sulphuric acid is to be started in Mysore State, India. A company with a capital of Rs. 25 lakhs has been formed, 10 per cent. of the capital being subscribed by the Government. For the first time in India, ammonium sulphate is to be produced by fixation of atmospheric nitrogen. It is proposed to manufacture 7,200 tons of ammonium sulphate and 9,000 tons of sulphuric acid per year. As sugar-cane cultivation is increasing in the State, there is a steady demand for ammonium sulphate from the cultivators. There is also a steady demand for sulphuric acid for the manufacture of industrial chemicals in Mysore State.

New Stoneware Cocks

Provision of Forced Lubrication

IN certain circumstances, stoneware cocks are liable to seize up, and are then difficult to release because great pressure cannot be applied. Seizing up is usually the result of having too great a pressure of liquid for the cock to hold back, so that the holding nut is unduly tightened to prevent leakage from the plug, or the seizure is due to the presence of solid matter in suspension or solution, which by remaining in the bore of the plug, adheres to the seating surfaces. Many attempts have been made to overcome this fault, such as the use of a stoneware plug with a metal barrel of acid resisting metal.

The latest development is the introduction of a forced lubrication stoneware cock by Apex Construction, Ltd. This



is a specially designed cock whereby suitable grease can be introduced and applied directly to the surfaces that have seized or are likely to seize up. A grease cavity is formed in the side of the cock and by a set screw the grease is forced along channels formed both in the plug and in the barrel so that the whole seating surface is kept covered with a thin film of grease which lubricates these surfaces and also prevents any solid matter from adhering to the surfaces and so result in seizure. Further, the grease is forced to the underside of the plug, so that pressure is applied which tends to lift the plug and so release it. The company also manufactures an improved highly vitrified stoneware which does not depend for its acid resistance on a surface glaze, but is itself non-porous and acid resisting. This new stoneware has increased density, a higher coefficient of expansion and increased resistance to changes of temperature, so that it is being used for the construction of plants, capable of being operated over wider temperature ranges, and with increased reliability.

BUTYRIC ALDEHYDE is obtained in 50 per cent. of the theoretical yield by catalytic dehydrogenation of normal butyl alcohol in presence of zinc oxide, according to Rivkine and co-workers (writing in *Sintet. Kaoutchouk*). The optimum temperature is 450°C. and butyl butyrate is simultaneously formed in 10 per cent. of the theoretical yield.

Personal Notes

SIR ROBERT HADFIELD, F.R.S., the metallurgist, celebrated his 79th birthday on November 29.

MR. J. S. DEWAR, scholar of Balliol, University of Oxford, has been awarded the Gibbs Scholarship in Chemistry for 1937.

MR. W. E. O. WALKER-LEIGH has been appointed a joint managing director of Cooper, McDougall and Robertson, Ltd., makers of insecticides and sheep-dips.

MR. JAMES WILSON, a native of Sanquhar, Dumfries, a director of Shawinigan Chemicals, Ltd., has been appointed vice-president and general manager to the Shawinigan Water and Power Co. in Montreal.

MR. A. J. HALL, B.Sc., F.I.C., left England for the United States on November 20, to conclude negotiations with a number of United States and Canadian companies who propose using the Dri-Sol (sulphuryl chloride) process for making wool materials unshrinkable.

MR. W. B. PICKERING, a former president of the Sheffield Chamber of Commerce, and a director of Hadfields, Ltd., has been elected chairman of the Sheffield district branch of the Federation of British Industries. He succeeds Mr. F. C. Fairholme, a former managing director of Thos. Firth and John Brown, Ltd., who has been chairman for twelve years.

MR. THEODORE INSTONE has been appointed chairman of S. Instone and Co., Ltd., in succession to his brother, the late Sir Samuel Instone. He is chairman of Doncaster Coalite, Ltd., and also a member of the board of British Benzol and Coal Distillation, Ltd., of which he was a founder. He is also a member of the Transportation Committee of the London Chamber of Commerce.

MR. H. H. SCHLAPP, now at the age of 84 years, has been presented with a certificate of honorary membership of the Australasian Institute of Mining and Metallurgy, in recognition of the valuable services which he rendered in the early development of mining and metallurgy in Australia. This certificate has been previously presented on two occasions only, namely, to Lord Cadman, chairman of the Anglo-Iranian Oil Co., Ltd., and to the late Mr. G. D. Delprat, of the Broken Hill Proprietary Co., Ltd. Mr. Schlapp, the present recipient, was among the first American metallurgists to be brought to Australia by the Broken Hill concern in 1886. He came from the Pueblo Smelting and Refining Works in Colorado.

DR. THOMAS H. NORTON, research chemist of the American Cyanamid Co., received the Lavoisier medal of the Societe Chimique de France at a recent meeting of the American Section of the Societe de Chimie Industrielle held at Columbia University. Comte de Ferry de Fontnouvelle, French Consul General, made the presentation. The medal is awarded to chemists of outstanding achievement who have been members of the Societe Chimique for fifty years. Dr. Norton, who has been a member since 1879, is an authority on synthetic resins and a pioneer in the American dyestuffs and nitrates industries. In accepting the medal, Dr. Norton, who is 86 years old, spoke of his "happy, profitable" stay from 1877 to 1883 in Paris, the city where Lavoisier made his notable discoveries. As manager of a large chemical works in Paris, La Compagnie General des Cyanures, he was engaged for five years in creating a new branch of industrial chemistry, the synthesis of the thiocyanates from carbon disulphide and ammonia, and their transformation into ferrocyanides. In 1883 Dr. Norton joined the faculty of the University of Cincinnati, where he remained for seventeen years, and in 1900 he entered the United States diplomatic service. After six years in Turkey, he became Government Consul in Germany. He conducted an investigation of the chemical industries of northern Europe, and during the world war he was influential in creating an independent American dyestuffs industry. He compiled a "census" of 6,000 artificial dyestuffs used in the United States.

MR. ALFRED HORSFALL has been elected to the board of Booth's Distilleries.

MR. F. SPROXTON delivered the Jubilee Memorial lecture at Birmingham on November 26. His subject was "The Rise of the Plastics Industry."

BAILIE DAVID MARTIN, who was recently elected Provost of Auchterarder, is a director of D. MacColl and Co., Ltd., aerated water manufacturers.

MR. FRANCIS REID, of Shirley, Adderstone Crescent, Newcastle-on-Tyne, a director of Cookson and Co., and of Cookson Lead and Antimony Co., has left estate valued at £38,239, with net personalty £34,826.

MR. C. H. HAMILTON, of Warren Road, Blundellsands, formerly chairman of William Gossage and Sons, is standing as independent candidate for West Ward in the new borough of Crosby, Lancashire.

MR. AND MRS. ALEXANDER, of Camelon, have just celebrated their golden wedding. For 42 years Mr. Alexander has been employed by James Ross and Co., chemical manufacturers, now the Scottish Tar Distillers, Ltd., of Camelon, Falkirk.

DR. F. HEATHCOAT, M.Sc., Ph.D., F.I.C., lecturer in chemistry and fuel technology at the Rotherdam College of Technology, has been appointed to the post of vice-principal and head of the chemistry department at the Technical College, Swansea.

MR. JOHN WILLIAM SOWDEN, of Hebden Bridge, Yorkshire, a director of the English Fustian Manufacturing Co., Ltd., Hebden Bridge, has left estate valued at £13,816, with net personalty £13,189.

MR. W. J. GICK, director of naval stores, will speak on "Oil in Relation to the Naval Supply Services," at the monthly luncheon of the Oil Industries Club, to be held at the Abercorn Rooms, Great Eastern Hotel, London on December 7.

OBITUARY

MR. WILLIAM HENRY LEGAT, managing director of W. H. Legat, Ltd., manufacturing chemists, of Kay Street, Bolton, died at his home at Bolton on November 24, at the age of 84. He came to Bolton in 1878, and there founded the firm which bears his name.

MR. LIONEL GUY RADCLIFFE, F.I.C., a former chairman and vice-president of the Society of Chemical Industry, has died at his home at Stretford, Manchester, after a long illness. Mr. Radcliffe retired in 1933 after completing forty-one years' service as lecturer in organic chemistry at Manchester University and the Manchester College of Technology. His long illness was due to an injury to his spine received by a fall soon after he retired. For his war-time researches on sulphonated oils used in dyeing he was awarded the gold medal of the Worshipful Company of Dyers.

DR. DUNCAN SCOTT MACNAIR, who died at Letchworth on November 27, at the age of 76, was one of the twelve inspectors appointed in 1893 to take charge of the scientific and technical instruction under the Science and Art Department. In 1881 the Government sent him to Cyprus as an analytical chemist. He established a laboratory there under great difficulties, but in the following year the post was discontinued and he returned. He then studied under Sir Henry Roscoe, Professor Schorlemmer, and Sir Arthur Schuster at Owens College, Manchester, taking the B.Sc. degree with honours at London University in 1890. He also spent four years at the University of Würzburg, working with Professor Emil Fischer, where he was awarded a doctorate for research on furfuran and its derivatives. Subsequently he worked at the East London College, now Queen Mary's College. One of his chief discoveries was a method of analysing a mixture of chlorides, bromides, and iodides, at that time a complex problem.

From Week to Week

ROBINSON BINDLEY PROCESSES, LTD., of 31 East Street, Epsom, Surrey, have changed their name to Synthetic Oils, Ltd.

IT IS UNDERSTOOD THAT A CASE HAS BEEN PREPARED against the new Caledonian Power Bill, and copies are to be sent to every member of the House of Commons.

THE BOARD OF TRADE announce that the treasury have made an Order under Section 10(5) of the Finance Act, 1926, exempting dinitro-orthocresol from key industry duty from December 8, 1937, until December 31, 1938.

DEVON COUNTY EDUCATION COMMITTEE are inviting tenders for the supply of laboratory apparatus for three secondary schools. Tender forms are obtainable from the Secretary of Education, Castle Street, Exeter.

THE LAUTARO NITRATE Co. will hold their meeting at Calle Augustinas 1070, Santiago, Chile, on December 30. The report for the year ended June 30, 1937, will be posted to shareholders early in December.

THE INTERNATIONAL SUGAR COUNCIL which was set up under the International Sugar Agreement, has issued a statistical bulletin giving the statistical background of the agreement, and also figures for production, exports, etc., of the principal countries concerned.

THE FURNACE ROOM AT THE KINLOCHLEVEN WORKS of the British Aluminium Co., which has lately struggled against tailing water power, closed down on November 30, due to the level of the water in the Blackwater reservoir having fallen to 3 ft. This is the first time for 22 years that the works have closed.

IMPORTS OF CHEMICALS AND CHEMICAL MANUFACTURES to the Irish Free State during the ten months January-October of this year amounted in value to £452,487, against £419,802 in the corresponding period last year, despite a sharp fall in the imports of chemical food preservatives and flour importers.

THE LEIPZIG SPRING FAIR, 1938, will be held March 6 to 14 inclusive. More than twenty countries with 9,000 exhibitors will be represented. Since 1933 the number of exhibitors has increased by 40 per cent., the number of foreign exhibitors showing an increase of 50 per cent.; in the same period the number of buyers has been trebled.

ON THE RECOMMENDATION of the Import Duties Advisory Committee the Treasury has issued an Order adding bagasse, sugarcane fibre cleaned and dried, but not further processed, to the Free List. This material is used in the manufacture of insulating and other boards. Another order removes insoluble quebracho extract from the Free List. It is the committee's intention to consider a scheme of drawback to assist the export trade of the home extract manufacturers.

BRIGHT ACID CYANINE G, now produced by J. R. Geigy Soc. An., of Basle, Switzerland, is similar to their older Brilliant Acid Cyanine 6B but greener in shade, whilst possessing equal brightness and richness and a good shade in artificial light. Like the older brand, Brilliant Acid Cyanine G possesses good fastness to washing, water, perspiration, stoving, decatizing and sea water and is suitable for dyeing wool, silk and mixture fabrics containing both fibres, which are dyed very solid.

NEGOTIATIONS ARE IN PROGRESS for the establishment of a wood pulp factory at Workington, Cumberland. The erection of the factory is being sponsored by a Continental concern, the name of which has not yet been divulged. The proposed site is on the River Derwent. The factory is estimated to cost between £500,000 and £750,000. About 800 persons will be employed when in production, and transparent and other classes of paper will be made from the pulp. It is stated that the factory will be in full production within two years.

A NEW REFINING PLANT FOR CRUDE PETROLEUM SPIRIT, erected by the Anglo-American Oil Co., Ltd., at Ellesmere Port, at a cost of £24,000, was inspected by visitors on November 26. The plant has been erected to cope with the increased demand for white spirit in the paint, rubber and other industries. The crude spirit, arriving in tankers at Stanlow Docks, on the Manchester Ship Canal, is pumped to storage tanks having a total capacity of 2,500,000 gallons. An elaborate system of control panels is installed to regulate the process under continuous conditions of working.

THE INSTITUTE OF PETROLEUM TECHNOLOGISTS in co-operation with an organising committee in Scotland, are making arrangements to hold a conference in Scotland from June 6 to 11, 1938, possibly at Glasgow. The objects of the conference are to provide an opportunity for a review of the present state of knowledge regarding the geology, mining, treatment and utilisation of shale and cannel, and to consider the problems of increasing oil supplies from indigenous sources of such materials. The programme will include visits to works engaged in the Scottish shale industry. The president of the conference will be Sir Thomas Holland, Principal and Vice-Chancellor of Edinburgh University.

ELLIOTT BROTHERS (LONDON), LTD., have issued a brochure entitled "An Impression of Progress." It illustrates a very wide range of instruments for industrial use.

ERINOID, LTD., held an extraordinary meeting this week at which resolutions for alterations in the company's articles of association and the conversion of shares into stock were unanimously passed.

A DECREE REDUCING THE EXCISE DUTY on sugar and molasses manufactured in Belgian factories from home-grown beet is published in the "Official Gazette." The duty is reduced by 40f. and 20f. per 100 kilos respectively.

THE MEXICAN EAGLE Co. has advised other petroleum companies in Mexico that it will be in accord with them in any action which they may take concerning the decision of the Government in the general oil controversy.

WORLD COPPER STOCKS rose by 38,262 short tons during October. Refined stocks alone rose by 37,262 tons. The increase was concentrated mainly in the United States. In the rest of the world, there was actually a slight fall in refined stocks, although blister stocks rose by 7,000 tons.

THE GERMAN TAX ON ALL RUBBER IMPORTS will be increased from Rm.125 per double hundredweight, to Rm.160 per double hundredweight as from December 1. The import tax of Rm.125 was introduced last May to help finance the production of Germany's synthetic rubber, which is still very costly.

A WIDE RANGE OF MACHINERY, constructional work and instrumental equipment is listed in the new "Handbook of British Refrigeration Material and Refrigeration Catalogue," 1938, published by Cold Storage and Produce Review, Empire House, St. Martin's-le-Grand, London, E.C.1, price 5s. 6d.

MEETINGS BETWEEN REPRESENTATIVES of the International Steel Cartel and the United States steel industry were held in London on November 29, to work out details of the agreement reached in Paris last week on the subject of American competition in European markets. The discussion will be continued for some weeks.

MR. ROBERT ARMITAGE, chairman of Brown, Bayleys Steel Works, Ltd., presiding at the annual meeting in Sheffield yesterday, drew attention to the fact that the ordinary shareholders had had no return on their capital since the formation of the company sixteen years ago, though in that period the workers had received £5,500,000.

TWO NEW STATUTORY RULES AND ORDERS relating to poisons have been published. No. 1029 (1937) relates to all alkylated-benzene diamines and their salts and all metallic oxalates; No. 1030 (1937) relates to digitalis, hydrocyanic acid, salts of barium, dinitrophenols, oxalic acid, metallic oxalates, sodium ethyl mercurithiosalicylate, and metallic oxalates other than potassium quadroxalate.

COMPENSATION RANGING FROM £300 has been paid to the widows and relatives of the five men who were killed in the explosion at Woolwich Arsenal in July, 1936. The awards followed an assurance given in the House of Commons that the men's families would be adequately provided for. The explosion occurred while the men were filling shells. One of the victims was Commander Long, of Sevenoaks, a research chemist.

THE USE OF FILMS TO GIVE INSTRUCTION in safe methods of working is being advocated by the Industrial Welfare Society and the National "Safety First" Association. These two organisations are attempting, as part of their joint accident prevention service, to establish a film library from which firms can hire safety films for exhibition to their employees. A joint committee has been set up to collect, as the nucleus of its library, as many as possible of the industrial safety films already in existence in this country. It will also encourage firms and groups of firms to make films applicable to their particular industries and will give advice in the making of these films, copies of which will be added to the library.

A BILL VESTING ALL NATURAL PETROLEUM IN NEW ZEALAND under Crown ownership, has been introduced into the House of Representatives and has passed its first reading. It prohibits prospecting for or exploitation of petroleum except under State licence. Existing prospecting rights are safeguarded for a year, during which the holders may obtain State licences. Preference in granting these is to be given for three months to persons who have already prospecting or mining agreements with landowners. Agreements made after December 31, 1936, are not to be recognised unless they are renewals of previous agreements. Prospecting licences will be for five years over a maximum area of 200 square miles. Mining licences will be for 42 years, with a possibility of extension for 21 years over a maximum area of 100 square miles. Other clauses ensure that the licence-holders shall undertake investigation and drilling, fix the royalties payable to the State, and give the State a prior right to petroleum products in war-time.

FLEXIBLE COUPLINGS, which compensate for a large degree of misalignment, and do so with no measurable loss of power, are the subject of an illustrated booklet issued by Silentbloc, Ltd.

TURNER AND NEWALL, LTD., have acquired a site in the neighbourhood of Johannesburg for the erection of their new asbestos cement factory.

INDUSTRIAL DRYING is the subject of a new publication (No. 1087) of the Sturtevant Engineering Co., Ltd. Illustrations show drying installations which are dealing with chemical products, woodwool, small phials, hanks of yarn, leather, paper, etc.

EXACT CONTROL OF TEMPERATURE within narrow limits is described in a booklet issued by the Magnetic Valve Co., Ltd. It is stated that for all practical purposes there is no control application problem that cannot be solved by magnetic valves.

THE WORLD POWER CONFERENCE will hold a sectional meeting in Vienna, August 25 to September 2, 1938, by invitation of the Austrian National Committee. The meeting will be followed by one or more "study tours," of approximately a week's duration. The British Government has received an invitation from the Austrian Government to be represented by official delegates.

GEARED MOTORS, which represent the most compact method of obtaining large speed reductions, are illustrated in Folder 3071 of Crofts (Engineers), Ltd. One of the illustrations shows a combined efficiency geared motor and double helical reduction gear with speeds reducing from 750 to 0.25 r.p.m.; another illustrates an infinitely variable speed drive with reductions from 1,440 to 0.32 r.p.m. Vertical shaft drives for stirrers are also illustrated.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2. at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

- CHEMICAL-REACTION CHAMBERS.**—A. A. Aicher. 31870.
ALLOYS FOR COATING METALS.—N. D. Berrick and W. H. Cussan. 32121.
MEANS FOR ACCELERATING THE GELATINISATION OF CELLULOSE NITRATE, ETC.—K. R. Brown, and J. T. Power. 31857.
MANUFACTURE OF CARBON.—W. A. Cloud. 32244.
PREPARATION OF SULPHONATED PRODUCTS.—Colgate-Palmolive-Peet Co. (United States, Dec. 21, '36.) 32116.
PREPARATION OF SULPHONATED PRODUCTS.—Colgate-Palmolive-Peet Co. (United States, April 22.) (Cognate with 32116.) 32117.
MANUFACTURE OF ORGANIC COMPOUNDS.—H. Dreyfus. 32033.
PRODUCTION OF CARBOCYANINE-LIKE DYESTUFFS, ETC.—N. V. Gevaert Photo Producten. (Austria, Nov. 23, '36.) 32293; (Austria, Nov. 28, '36.) 32294.
WATERPROOFING OF FIBRES, ETC.—W. W. Groves (I. G. Farbenindustrie.) 32218, 32357.
MANUFACTURE OF RUBBER-LIKE MATERIALS.—B. J. Habgood. 32146.
METAL ALLOYS.—H. J. Henbrey. 32168.
ALUMINIUM ALLOYS.—I. G. Farbenindustrie. (Germany, Dec. 11, '36.) 32143.
MANUFACTURE OF AZO-DYESTUFFS.—I. G. Farbenindustrie. (Germany, Nov. 26, '36.) 32404.
RECOVERY OF SULPHUR DIOXIDE FROM GAS MIXTURES.—Imperial Chemical Industries, Ltd. (Germany, Feb. 9.) 31949.
MANUFACTURE OF DIOLFINES.—G. W. Johnson (I. G. Farbenindustrie.) 31793.
MANUFACTURE OF REACTION PRODUCTS FROM ACID AMIDES.—G. W. Johnson (I. G. Farbenindustrie.) 32150.
PRODUCTION OF CHROMIC ACID.—S. C. E. Melkman. 32157.
ZINC ALLOYS.—National Smelting Co., Ltd. (Germany, Feb. 13.) 31948.
DISTILLATION OF ZINC.—National Smelting Co., Ltd. 31918.
PLASTIC SHAPING OF ZINC ALLOYS.—National Smelting Co., Ltd. (Germany, June 2.) 32025.
POISON FOR DESTROYING INSECTS, ETC.—W. E. Ripper. (Austria, Nov. 20, '36.) 31776; (Austria, April 20.) 31777.
DISTILLATION OF ZINC.—S. Robson. 31918.
MANUFACTURE OF AZO-DYESTUFFS.—Soc. of Chemical Industry in Basle. (Switzerland, Nov. 19, '36.) 31873; (Switzerland, Nov. 18.) 31874.
CATALYSTS, ETC.—A. Wassermann. 32019.
FERMENTATION OF ORGANIC MATTER.—Wellesley Holdings, Ltd., and C. S. Townsend. 32161.
MANUFACTURE OF ARTIFICIAL FERTILISERS.—A. Zangger. 31939.

Specifications Open to Public Inspection

- METALLIC PIGMENT PASTES.**—Metals Disintegrating Co., Inc. May 16, 1936. 18106/36.
PROCESS FOR THE MANUFACTURE OF LIGHT ALLOYS.—A. Borgnis. May 19, 1936. 28363/36.

FOR THE THIRD SUCCESSIVE YEAR, Canada's nickel output established a new all-time record during 1936. The finally revised figures show a total of 169,739,393 lb. valued at \$43,876,525, against 138,516,240 lb. valued at \$35,345,103 in 1935.

AN EXPLOSION OCCURRED at the Royal Gunpowder Factory at Waltham Cross, Essex, on December 1. A "stove" used for drying cordite was shattered. No one was injured, but houses three miles away were shaken. A cordite "stove" is a building about 20 by 25 ft. Estimates of the amount of cordite drying in the shattered building vary from 50 to 150 tons.

A RECORD DEMAND FOR 943,352 SQUARE FEET OF FLOOR SPACE at the British Industries Fair is announced by the Department of Overseas Trade. Holland still leads the thirty countries from which buyers have already intimated their intention to visit the Fair. Belgium is second, closely followed by the Irish Free State, with France, Germany, Denmark and Norway next in order.

THE NEW ZEALAND CENTENNIAL EXHIBITION to be held at Wellington, November, 1939, to April, 1940, will mark the completion of one hundred years of British Sovereignty and organised settlement in New Zealand. The New Zealand Government is lending its full support to the project, firstly by contributing £75,000 to the scheme, and secondly by making available the resources of the various Departments of State. The Chemical Industries will be represented by exhibits of acids, alkalies, heavy and technical chemicals, medicinal and fine chemicals, chemicals for all industries, synthetics, fertilisers, etc. Oils, cellulose lacquers, paints and varnishes, distempers, leather, rubber, soaps and toilet requisites will also be exhibited.

MANUFACTURE OF AMINO-SUBSTITUTED ARSENOBENZENE FORMALDEHYDE-BISULPHITE COMPOUNDS.—I. G. Farbenindustrie. May 22, 1936. 11670/37.

APPARATUS FOR THE SATURATION OF LIQUIDS BY GAS.—R. E. Roth. May 22, 1936. 4311/37.

PROCESS FOR THE PREPARATION OF ETHERIFIED DERIVATIVES OF PENTAHYDROXYFUCHSENE.—Chinoin Gyogyszer es Vegyeszeti Termek Gyard Reszvenytarsasag, Dr. Kreszty and Dr. Wolf. May 18, 1936. 6968/37.

MANUFACTURE OF COMMUNITED CALCIUM CARBIDE.—A. G. Fur Stickstoff-Dunger. May 19, 1936. 11879/37.

PROCESS FOR THE PRODUCTION OF A DRY FATTY OIL FROM CASTOR OIL.—F. Munzel. May 19, 1936. 13634/37.

MANUFACTURE OF DIAMINODIPHENOXANTHRAQUINONEDISULPHONIC ACIDS.—E. I. du Pont de Nemours and Co. May 20, 1936. 13999/37.

MANUFACTURE AND PRODUCTION OF AZO COMPOUNDS of high molecular weight.—I. G. Farbenindustrie. May 22, 1936. 14202/37.

Specifications Accepted with Date of Application

MANUFACTURE OF IRON.—H. A. Brassert and Co., Ltd., H. A. Brassert, and T. P. Colclough. Feb. 12, 1936. 475,345.

MANUFACTURE AND APPLICATION OF TITANIUM DIOXIDE PRODUCTS.—H. Dreyfus. May 14, 1936. 475,356.

CEMENTATION OF STEEL AND ALLOY STEELS.—A. Deutzmann. May 28, 1935. 475,359.

MANUFACTURE OF POLYMERISATION PRODUCTS.—F. B. Dehm. (Röhm and Haas, A.-G.) May 18, 1936. 475,552.

MANUFACTURE OF MONOAZO DYESTUFFS.—A. H. Knight, and Imperial Chemical Industries, Ltd. May 18, 1936. 475,423.

MANUFACTURE OF 2-HYDROXYNAPHTHALENE-DICARBOXYLIC ACIDS.—W. W. Groves (I. G. Farbenindustrie.) May 19, 1936. 475,505.

PROCESS FOR THE MANUFACTURE OF PYRIMIDINE COMPOUNDS.—A. Carpmal (I. G. Farbenindustrie.) May 19, 1936. 475,559; 475,507.

MANUFACTURE OF ESTERS OF PHOSPHORIC ACID.—British Celanese, Ltd., A. J. Daly, and W. G. Lowe. May 22, 1936. 475,523.

ALUMINIUM ALLOY.—Nihon Kako Kabushiki Kaisha, and Y. Matuenaga. June 27, 1936. 475,373.

PREPARING NUTRITIVE AMINO-ACID PREPARATIONS.—S. Mizuno, and Santendo Kabushiki Kaisha. July 30, 1936. 475,291.

PROCESS FOR THE MANUFACTURE OF MERCAPTO ARYL THIAZOLES.—Wingfoot Corporation. Nov. 1, 1935. 475,296.

MANUFACTURE OF SULPHURIC ESTERS OF UNSATURATED HIGHER ALCOHOLS.—W. P. Williams (Procter and Gamble Co.). Jan. 22, 1937. 475,235.

MANUFACTURE OF CONDENSATION PRODUCTS of the anthraquinone series.—Chemical Works, formerly Sandoz. Jan. 27, 1936. 475,386.

BITUMINOUS EMULSION AND METHOD OF PREPARING SAME.—International Bitumen Emulsions, Ltd. Feb. 18, 1936. 475,387.

PREPARATION OF CELLULOSE ETHERS.—Dow Chemical Co. March 6, 1936. 475,466.

TREATMENT OF HYDROCARBONS of low-boiling point.—Edeleanu Ges. May 15, 1935. (Divided out of 467,048.) 475,255.

Forthcoming Events

Leeds.

December 6.—Society of Chemical Industry (Yorkshire Section)-joint meeting with Road and Building Materials Group, at the University. T. H. Blakeley, "The Classification of Tars and Oils according to their Physical Properties."

London.

December 6.—Society of Chemical Industry (London Section) at Burlington House, Piccadilly, W.1, at 8 p.m. Dr. E. Lester Smith, "Saponification in Colloidal Systems."

December 7.—British Association of Refrigeration, at Institute of Marine Engineers, 85-88 Minories, E.C.3, at 6.30 p.m. "Small Air-Conditioning Units." Informal Meeting.

December 9.—Oil and Colour Chemists' Association, at The Federation of British Industries, 21 Tothill Street, S.W.1, at 7.30 p.m. C. W. A. Mundy, "Recent Advances in the Drying Oil Field."

December 14.—Pharmaceutical Society, 17 Bloomsbury Square, W.C.1, at 8.30 p.m. F. Wokes, "Biochemistry and Pharmacy."

Belfast.

December 6.—Institute of Civil Engineers, Northern Ireland Association, at Queen's University, at 6.15 p.m. R. D. Duncan, "Explosives."

Birmingham.

December 7.—Electrodepositors' Technical Society, at James Watt Memorial Institute, Gt. Charles Street, at 7.30 p.m. T. A. Edwards, "Safety and Prevention of Accidents."

December 9.—Institute of Vitreous Enamellers, at Chamber of Commerce, New Street, at 7.30 p.m. H. Cowan, "Analysis of Cast Iron Suitable for Vitreous Enamelling."

Society of Chemical Industry (Birmingham and Midland Section), at the University, Edgbaston, at 5.30 p.m. Dr. C. H. Johnson, "The Application of Radio-Active Elements to Chemical Problems."

Derby.

December 14.—British Association of Chemists, at Cavendish Cafe, Corn Market. Debate, "That the Chemist's Training is Inadequate for his Job."

Edinburgh.

December 10.—Society of Chemical Industry (Glasgow Section), at North British Station Hotel. Dr. E. B. Moxted, Jubilee memorial lecture, "Catalysis and its Application to Industry"

Huddersfield.

December 14.—Institute of Chemistry (Huddersfield Section), Dr. E. A. Fisher, "Some Scientific Aspects of Baking Quality in Flour."

Liverpool.

December 8.—British Association of Chemists (Liverpool Section), at Constitutional Club, India Buildings, Water Street, at 7.30 p.m. Meeting.

December 9.—Institute of Chemistry (Liverpool and North-Western Section), at Constitutional Club, Water Street, at 7.30 p.m. Social Evening.

Manchester.

December 7.—Institute of Fuel (North-Western Section), at Engineers' Club, 17 Albert Square, at 7 p.m. Dr. H. G. Shatwell, "Recent Developments in the Synthesis of Motor Fuels."

December 9.—Institute of Vitreous Enamellers (Northern Section), at Queen's Hotel, Piccadilly, at 7.30 p.m. "Carborundum—Its Origin and Uses."

Workington.

December 10.—West Cumberland Society of Chemists and Engineers, at the Workington Technical College, at 7 p.m. S. E. Holgate, "Applications of Modern Blast Furnace Plant."

Books Received

Very Low Temperatures. Edited by T. C. Crawhall. Book Three. Pp. 75. London: H.M. Stationery Office. 1s. 3d.

Drugs and Galenicals: Their Quantitative Analysis. By D. C. Garratt. Pp. 422. London: Chapman and Hall. 25s.

Analytical Chemistry. Translated and Revised by W. T. Hall. Pp. 630. London: Chapman and Hall. 22s. 6d.

Physical Chemistry. By J. N. Bronsted. Pp. 390. London: William Heinemann, Ltd. 12s. 6d.

Addresses at the Exercise and Science Symposium during the dedication of the New Building of Mellon Institute, Pittsburgh. Pp. 71.

1938 Handbook of British Refrigeration Material and Refrigeration catalogue. London: The Cold Storage and Produce Review. Pp. 200. 5s.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

South Africa.—An agent established at Port Elizabeth and having connections in the leather and footwear industries, wishes to obtain the representation, on a commission, consignment or purchasing basis, of United Kingdom manufacturers of tanning materials and chemicals for the Union of South Africa. (Ref. No. 358.)

Belgium.—A firm of wholesalers and agents established at Brussels wish to obtain the representation of United Kingdom manufacturers of chemical products on a commission basis or for their own account. (Ref. No. 359.)

Chemical and Allied Stocks and Shares

A MUCH firmer tone has developed in the industrial section of the Stock Exchange. The volume of business has improved, buyers being attracted by the low levels to which prices declined recently, and the tendency is for market sentiment to be influenced less by the trend of Wall Street and trade conditions in the United States.

Most active shares of companies operating in the chemical and kindred trades have shown favourable recovery in prices. Imperial Chemical gained 2s. 6d. to 35s. and Distillers have made a large recovery to 104s., which compares with 99s. 6d. a week ago. United Molasses were also a good feature, these 6s. 8d. units having gained 1s. 6d. to 24s. 6d. aided by the excellent results for the past year which were well received in the market where a dividend of not more than 20 per cent. was generally expected. British Oxygen have risen on balance from 78s. 9d. to 89s. 4½d. and are now above the price current prior to the general market reaction shown in the early part of last week. Turner and Newall also came in for a good deal more attention on the possibility of a moderate increase in the dividend to 20 per cent., and the price has moved up on balance from 75s. 7½d. to 83s. 9d.

Boots Pure Drug were another good feature, having recovered from 42s. 9d. to 47s. British Match are 6d. better at 36s. 3d., and Sangers have put on 1s. to 23s. Borax Consolidated were responsive to the better market trend and have risen from 26s. 3d. to 27s. 9d.

Fison, Packard and Prentice were done around 35s. Cooper, McDougall and Robertson remained at 32s. 6d., but were inactive, as were British Glues, which were around 6s. Unilever were dull and at 35s. are 1s. lower on balance. British Plaster

Board were little changed at 30s., allowing for the fact that the price is now "ex" the 20 per cent. interim dividend. Imperial Smelting were higher at 14s., compared with 12s. 9d. Associated Portland Cement were in demand and are 86s. 3d. at the time of writing, compared with 82s. 6d. a week ago. Pinchin Johnson improved 6d. to 37s. 9d., and other paint shares were inclined to make higher prices.

Demand was reported for British Aluminium; the price has moved up strongly to 45s. in response to market anticipations that, despite the larger capital, an increase in the dividend from 10 per cent. to 12½ per cent. is not unlikely. Triplex Glass ordinary made the higher price of 54s., while General Refractories were better at 21s. The dividend on the 10s. shares of the last-named company was 16 per cent. last year. The disposition in the market is to budget for an increase to 18 per cent. for the current year, granted iron and steel manufacturers and the company's other main customers remain actively employed. B. Laporte, which are "ex" the interim dividend, transferred at 95s.

Iron and steel shares benefited considerably from the better general market conditions. Dorman Long were particularly good and are 34s. 9d., compared with 32s. 6d. a week ago, the full report having drawn attention to the general strength of the company's position. Consett Iron, also showed favourable improvement in price. Babcock and Wilcox were in request at 44s. South Durham Steel and Iron shares responded to the larger dividends. Oil shares showed good recovery earlier in the week, but subsequently lost part of the improvement, there having been renewed talk in the market of an impending reduction in the price of petrol.

Weekly Prices of British Chemical Products

TRADING conditions throughout the chemical markets have been definitely quiet during the week, and movements of chemicals into consumption have been on a much smaller scale than usual. The absence of any brisk demand, however, is not regarded as having any particular significance, most of the important consumers having already covered their requirements to the end of the year. An increasing interest is displayed in forward bookings for 1938 and the bulk of the regular forward business has yet to be negotiated. An increase of 1d. per lb. in the quotations for potassium dichromate and sodium dichromate has been notified; the advance is reported to be due to increased costs of production. There are no other important price changes to record for general chemicals, rubber chemicals and wood distillation products, values on the whole being steady with a firm undertone. Conditions in the coal tar section continue on the quiet side and quotations for most of the products remain steady. Toluol is a little easier and there has been a slight fall in the quotation for xylol. Prompt supplies of carbolic acid crystals are still difficult to negotiate.

MANCHESTER.—Easiness has been a feature of a number of the coal tar products on the Manchester market, carbolic acid having

weakened somewhat compared with the levels recently obtainable both for crystals and the crude material, whilst in both cresylic acid and the naphthalenes lower prices are also being quoted. In most other directions, however, prices on the chemical market here during the past week have been on a steady to firm basis. Textile chemicals generally are being called for in fair quantities, and there is also a continued steady movement of other materials into consumption. Interest in contract commitments for delivery during the coming year is increasing and traders report that a moderate amount of forward business has been put through in the aggregate, although the movement is not yet in full swing.

GLASGOW.—Business in general chemicals has been rather quiet during the week, both for home trade and export for early deliveries, but a fair amount of interest is being shown in contracts for 1938 deliveries. Prices generally continue very firm at about previous figures, and bichromate of potash and bichromate of soda have been increased by 1d. (one farthing) per lb. for bulk quantities, and 1d. (one halfpenny) per lb. for small quantities. There is no further change in lead and copper products.

Price Changes

Rises: Sodium Dichromate.

Falls: Carbolic Acid (Manchester); Cresylic Acid (Manchester), Pale, 99/100%; Naphthalene (Manchester), Refined; Pyridine, 90/140%, 90/160%; Chromium Oxide; Toluol; Xylol.

General Chemicals

ACETONE.—£45 to £47 per ton.

ACETIC ACID.—Tech., 80%, £30 5s. per ton; pure 80%, £32 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground, £10 7s. 6d. per ton; lump, £9 17s. 6d.

ALUMINIUM SULPHATE.—£7 per ton d/d Lancs.; GLASGOW: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 1s. to 1s. 1d. per lb. d/d in cylinders. SCOTLAND: 10½d. to 1s. 0½d., containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks.

AMMONIUM CHLORIDE.—Grey galvanising, £17 10s. per ton, ex wharf.

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Sal ammoniac.)

AMMONIUM DICHROMATE.—8d. per lb. d/d U.K.

ANTIMONY OXIDE.—£68 per ton.

ARSENIC.—Continental material £11 per ton c.i.f., U.K. ports; Cornish White, £12 5s. to £12 10s. per ton f.o.r., mines, according to quantity. MANCHESTER: White powdered Cornish, £16 10s. per ton, ex store.

BARIUM CHLORIDE.—£11 10s. to £12 10s. per ton in casks ex store. GLASGOW: £11 10s. per ton.

BLEACHING POWDER.—Spot, 35/37%, £8 15s. per ton in casks, special terms for contracts. SCOTLAND: £9 per ton net ex store.

BORAX COMMERCIAL.—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Granulated, £16, crystal, £17; powdered, £17 10s. per ton in 1-cwt. bags, carriage paid.

BORIC ACID.—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.

CALCIUM BISULPHITE.—£6 10s. per ton f.o.r. London.

CHARCOAL, LUMP.—£6 to £6 10s. per ton, ex wharf. Granulated, £7 to £9 per ton according to grade and locality.

CHROMETAN.—Crystals, 2½d. per lb.; liquor, £19 10s. per ton d/d station in drums. GLASGOW: 70/75% solid, £5 15s. per ton net ex store.

CHROMIC ACID.—9½d. per lb., less 2½%; d/d U.K.

CHROMIUM OXIDE.—1½d. per lb.; d/d U.K.

CITRIC ACID.—1s. 0½d. per lb. MANCHESTER: 1s. 0½d. SCOTLAND: B.P. crystals, 1s. 0½d. per lb.; less 5%, ex store.

COPPER SULPHATE.—£21 7s. 6d. per ton, less 2% in casks. MANCHESTER: £18 15s. per ton f.o.b. SCOTLAND: £20 10s. per ton, less 5%, Liverpool, in casks.

CREAM OF TARTAR.—100%, 92s. per cwt., less 2½%. GLASGOW: 99%, £4 12s. per cwt. in 5-cwt. casks.

FORMALDEHYDE.—£22 10s. per ton.

FORMIC ACID.—85%, in carboys, ton lots, £42 to £47 per ton.

GLYCERINE.—Chemically pure, double distilled, 1,260 s.g., in tins, £5 7s. 6d. to £6 7s. 6d. per cwt. according to quantity; in drums, £5 to £5 13s. 6d.

HYDROCHLORIC ACID.—Spot, 5s. to 7s. 6d. carboy d/d according to purity, strength and locality.

IODINE.—Resublimed B.P., 6s. 4d. per lb. in 7 lb. lots.

LACTIC ACID.—(Not less than ton lots) Dark, 50% by volume, £21 10s.; by weight, £27 10s.; Pale, 50% by volume, £27; by weight, £32 per ton. LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50%, by vol., £41. One-ton lots ex works, barrels free.

LEAD ACETATE.—LONDON: White, £31 10s. ton lots; brown, £35.

GLASGOW: White crystals, £32 10s.; brown, £1 per ton less.

MANCHESTER: White, £35; brown, £34.

LEAD NITRATE.—£34 per ton for 1-ton lots.

LEAD, RED.—£32 15s. 0d., 10 cwt. to 1 ton, less 2½% carriage paid.

SCOTLAND: £32 per ton, less 2½% carriage paid for 2-ton lots.

LITHARGE.—SCOTLAND: Ground, £32 per ton, less 2½% carriage paid for 2-ton lots.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—SCOTLAND: £7 10s. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 10s. per ton, ex wharf.

MERCURY.—Ammoniated B.P. (white precip.), lump, 5s. 1½d. per lb.; powder B.P., 6s. 1d.; bichloride B.P. (corros. sub.)

5s. 2d.; powder B.P. 4s. 10d.; chloride B.P. (calomel),

5s. 1½d.; red oxide cryst. (red precip.), 7s.; levig. 6s. 6d.;

yellow oxide B.P. 6s. 4d.; persulphate white B.P.C., 6s. 1d.;

sulphide black (hyd. sulph. cum sulph. 50%), 6s. For quantities under 112 lb., 1d. extra.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.;

pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range

of prices is according to quantities. SCOTLAND: Industrial

64 O.P., 1s. 9d. to 2s. 4d.

NITRIC ACID.—80° Tw. spot, £16 10s. per ton makers' works.

OXALIC ACID.—£48 15s. to £57 10s. per ton, according to packages

and position. GLASGOW: £2 9s. per cwt. in casks. MAN-

CHESTER: £49 to £54 per ton ex store.

PARAFFIN WAX.—SCOTLAND: 3½d. per lb.

POTASH CAUSTIC.—Solid, £35 5s. to £36 15s. per ton for 2-ton lots

ex store; broken, £42 per ton. MANCHESTER: £39.

POTASSIUM CHLORATE.—£36 7s. 6d. per ton. GLASGOW: 4½d. per

lb. MANCHESTER: £38 per ton.

POTASSIUM DICHROMATE.—5½d. per lb. carriage paid. SCOTLAND:

5d. per lb., net, carriage paid.

POTASSIUM IODIDE.—B.P. 5s. 6d. per lb. in 7 lb. lots.

POTASSIUM NITRATE.—Small granular crystals, £24 to £27 per

ton ex store, according to quantity. GLASGOW: Refined

granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton

ex store.

POTASSIUM PERMANGANATE.—LONDON: 9½d. per lb. SCOTLAND:

B.P. Crystals, 9½d. MANCHESTER: B.P. 10½d. to 1s.

POTASSIUM PRUSSIAN.—6½d. per lb. SCOTLAND: 7d. net, in casks,

ex store. MANCHESTER: Yellow, 6½d.

SALAMMONIAC.—Dog-tooth crystals, £36 per ton, fine white

crystals, £16 10s. per ton, in casks, ex store. GLASGOW:

Large crystals, in casks, £37 10s.

SALT CAKE.—Urground, spot, £3 to £3 10s. per ton.

SODA ASH.—58% spot, £5 17s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £12 10s. per ton d/d station.

SCOTLAND: Powdered 98/99%, £7 10s. in drums,

£19 5s. in casks, Solid 76/77° £15 12s. 6d. in drums; 70/73%,

£15 12s. 6d., carriage paid buyer's station, minimum 4-ton

lots; contracts, 10s. per ton less.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£18 per ton carriage paid North. GLASGOW: £17 15s. per ton net ex store.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. GLASGOW: £13 5s. per ton in 1 cwt. kegs, £11 5s. per ton in 2-cwt. bags. MANCHESTER: £10 10s.

SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1 cwt. iron drums for home trade.

SODIUM CARBONATE MONOHYDRATE.—£15 5s. per ton d/d in minimum ton lots in 2 cwt. free bags

SODIUM CHLORATE.—£27 10s. to £32 per ton. GLASGOW: £1 11s. per cwt., minimum 3 cwt. lots.

SODIUM CHROMATE.—4½d. per lb. d/d U.K.

SODIUM DICHROMATE.—Crystals cake and powder 4½d. per lb. net d/d U.K. with rebates for contracts. MANCHESTER: 4d. per lb. GLASGOW: 4d. net, carriage paid.

SODIUM HYPOSULPHITE.—Pea crystals, £14 10s. per ton for 2-ton lots; commercial, £11 5s. per ton. MANCHESTER: Commercial, £11; photographic, £15 10s.

SODIUM METASILICATE.—£14 5s. per ton, d/d U.K. in cwt. bags.

SODIUM NITRATE.—Refined, £8 per ton for 6-ton lots d/d. GLASGOW: £1 12s. 6d. per cwt. in 1-cwt. kegs, net, ex store.

SODIUM NITRITE.—£18 5s. per ton for ton lots.

SODIUM PERBORATE.—10%, 9½d. per lb. d/d in 1-cwt. drums.

SODIUM PHOSPHATE.—Di-sodium, £12 per ton delivered for ton lots. Tri-sodium, £15 to £16 per ton delivered per ton lots.

SODIUM PRUSSIAN.—½d. per lb. for ton lots. GLASGOW: 5d. to 5½d. ex store. MANCHESTER: 4d. to 4½d.

SODIUM SILICATE.—£9 10s. per ton.

SODIUM SULPHATE (GLAUBER SALTS).—£3 per ton d/d.

SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 to £3 10s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 12s. 6d.

SODIUM SULPHIDE.—Solid 60/62%, Spot, £11 5s. per ton d/d in drums; crystals 30/32%, £8 15s. per ton d/d in casks. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 10s.

SODIUM SULPHITE.—Pea crystals, spot, £13 10s. per ton d/d station of 5 cwt. and upwards. MANCHESTER: 1s. 1½d. per lb.

SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.

SULPHURIC ACID.—168° Tw., £4 11s. to £5 1s. per ton; 140° Tw., arsenic-free, £3 to £3 10s.; 140° Tw., arsenious, £2 10s.

TARTARIC ACID.—1s. 1½d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 1s. 1½d. per lb. GLASGOW: 1s. 1d. per lb., 5%, ex store.

WHITE SUGAR OF LEAD.—£31 10s. per ton net.

ZINC SULPHATE.—Tech., £12 10s. f.o.r., in 2 cwt. bags.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 7d. to 1s. 2d. per lb., according to quality. Crimson, 1s. 6d. to 1s. 7½d. per lb.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARYTES.—£6 to £6 10s. per ton, according to quality.

CADMIUM SULPHIDE.—7s. 6d. to 7s. 9d. per lb.

CARBON BLACK.—4½d. per lb., ex store.

CARBON DISULPHIDE.—£31 to £33 per ton, according to quantity, drums extra.

CARBON TETRACHLORIDE.—£41 to £46 per ton, according to quantity, drums extra.

CHROMIUM OXIDE.—Green, 10½d. to 11d. per lb.

DIPHENYLQUANTINE.—2s. 2d. per lb.

INDIA-RUBBER SUBSTITUTES.—White, 4½d. to 5½d. per lb.; dark 4d. to 4½d. per lb.

LAMP BLACK.—£28 to £30 per ton del., according to quantity. Vegetable black, £35 per ton upwards.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE.—30%, £16 10s. to £17 5s. per ton.

SULPHUR.—£9 to £9 5s. per ton. SULPHUR PRECIP. B.P., £55 to £60 per ton. SULPHUR PRECIP. COMM., £50 to £55 per ton.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quantity.

VERMILION.—Pale, or deep, 5s. per lb., 1-cwt. lots.

ZINC SULPHIDE.—£58 to £60 per ton in casks ex store, smaller quantities up to 1s. per lb.

Nitrogen Fertilisers

AMMONIUM SULPHATE.—The following prices have been announced for neutral quality basis 20.6% nitrogen, in 6-ton lots delivered farmer's nearest station up to June 30, 1938: November, £7 8s.; December, £7 9s. 6d.; January, 1938, £7 11s.; February, £7 12s. 6d.; March/June, £7 14s.

CALCIUM CYANAMIDE.—The following prices are for delivery in 5-ton lots, carriage paid to any railway station in Great Britain up to June 30, 1938: November, £7 10s.; December, £7 11s. 3d.; January, 1938, £7 12s. 6d.; February, £7 13s. 9d.; March, £7 15s.; April/June, £7 16s. 3d.

NITRO CHALK.—£7 10s. 6d. per ton up to June 30, 1938.

SODIUM NITRATE.—£8 per ton for delivery up to June 30, 1938.

CONCENTRATED COMPLETE FERTILISERS.—£11 4s. to £11 13s. per ton in 6-ton lots to farmer's nearest station.

AMMONIUM PHOSPHATE FERTILISERS.—£10 19s. 6d. to £14 16s. 6d. per ton in 6-ton lots to farmer's nearest station.

Coal Tar Products

BENZOL.—At works, crude, 9½d. to 10d. per gal.; standard motor, 1s. 3d. to 1s. 3½d.; 90%, 1s. 4d. to 1s. 4½d.; pure, 1s. 8d. to 1s. 8½d. GLASGOW: Crude, 10d. to 10½d. per gal.; motor, 1s. 4d. to 1s. 4½d.

CARBOLIC ACID.—Crystals, 7½d. to 8½d. per lb., small quantities would be dearer; Crude, 60's, 4s. to 4s. 3d., dehydrated, 4s. 6d. to 4s. 9d. per gal. MANCHESTER: Crystals, 9½d. per lb. f.o.b. in drums; crude, 4s. 2d. per gal. GLASGOW: Crude, 60's, 4s. 3d. to 4s. 6d. per gal.; distilled, 60's.

CREOSOTE.—Home trade, 6½d. to 6¾d. per gal., f.o.r. makers' works; exports, 6¾d. to 6¾d. per gal., according to grade. MANCHESTER: 5½d. to 6½d. GLASGOW: B.S.I. Specification, 6d. to 6½d. per gal.; washed oil, 5d. to 5½d.; lower sp. gr. oils, 5½d. to 6½d.

CRESYLIC ACID.—97/99%, 4s. 1d. to 4s. 6d.; 99/100%, 4s. 6d. to 5s. 6d. per gal., according to specification; Pale, 99/100%, 4s. 6d. to 4s. 10d.; Dark, 95%, 3s. 9d. to 4s. 2d. per gal. GLASGOW: Pale, 99/100%, 5s. to 5s. 6d. per gal.; pale, 97/99%, 4s. 6d. to 4s. 10d., dark, 97/99%, 4s. 3d. to 4s. 6d.; high boiling acids, 2s. to 2s. 6d. American specification, 4s. 3d. to 4s. 6d. MANCHESTER: Pale, 99/100%, 4s. 2d.

NAPHTHA.—Solvent, 90/160, 1s. 6½d. to 1s. 7½d. per gal.; solvent, 95/160%, 1s. 7d. to 1s. 8d., naked at works; heavy 90/190%, 1s. 1½d. to 1s. 3d. per gal., naked at works, according to quantity. GLASGOW: Crude, 6½d. to 7½d. per gal.; 90%, 160, 1s. 5d. to 1s. 6d., 90%, 190, 1s. 1d. to 1s. 3d.

NAPHTHALENE.—Crude, whizzed or hot pressed, £8 to £9 per ton; purified crystals, £18 per ton in 2-cwt. bags. LONDON: Fire lighter quality, £5 10s. to £7 per ton. GLASGOW: Fire lighter, crude, £6 to £7 per ton (bags free). MANCHESTER: Refined, £18 10s. per ton f.o.b.

PITCH.—Medium, soft, 36s. to 38s. per ton, f.o.b. MANCHESTER: 36s. 6d. f.o.b., East Coast. GLASGOW: f.o.b. Glasgow, 35s. to 37s. per ton; in bulk for home trade, 35s.

PYRIDINE.—90/140%, 12s. to 14s. 9d. per gal.; 90/160%, 11s. to 12s. 6d. per gal.; 90/180%, 3s. 3d. to 3s. 6d. per gal. f.o.b. GLASGOW: 90% 140, 10s. to 12s. per gal.; 90% 160, 9s. to 10s.; 90% 180, 2s. 6d. to 3s. MANCHESTER: 12s. 6d. to 14s. per gal.

TOLUOL.—90%, 1s. 10½d. per gal.; pure, 2s. 3½d. to 2s. 4½d. GLASGOW: 90% 120, 1s. 10d. to 2s. 1d. per gal.

XYLOL.—Commercial, 2s. 2½d. per gal.; pure, 2s. 4½d. GLASGOW: Commercial, 2s. to 2s. 1d. per gal.

Wood Distillation Products

CALCIUM ACETATE.—Brown, £7 15s. to £8 5s. per ton; grey, £10 to £11. Liquor, brown, 30° Tw., 6d. to 8d. per gal. MANCHESTER: Brown, £9 10s.; grey, £11 10s.

METHYL ACETONE.—40.50%, £40 to £42 per ton.

WOOD CREOSOTE.—Unrefined 6d. to 9d. per gal., according to boiling range.

WOOD NAPHTHA, MISCIBLE.—2s. 8d. to 3s. 3d. per gal.; solvent, 3s. 6d. to 3s. 9d. per gal.

WOOD TAR.—£2 to £8 per ton, according to quality.

Intermediates and Dyes

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.

BENZIDINE, HCl.—2s. 5d. per lb., 100% as base, in casks.

BENZOIC ACID, 1914 B.P. (ex toluol).—1s. 9½d. per lb. d/d buyer's works.

m-CRESOL 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.

o-CRESOL 30/31° C.—6½d. to 7½d. per lb. in 1-ton lots.

p-CRESOL, 34.5° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.

DICHLORANILINE.—1s. 11½d. to 2s. 3d. per lb.

DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.

DINITROBENZENE.—7½d. per lb.

DINITROCHLOROBENZENE, SOLID.—£72 per ton.

DINITROTOLUENE.—48/50° C., 8½d. per lb.; 66/68° C., 10d.

DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.

GAMMA ACID.—Spot, 4s. per lb. 100% d/d buyer's works.

H ACID.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.

NAPHTHIONIC ACID.—1s. 8d. per lb.

α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.

β-NAPHTHOL.—9½d. to 9¾d. per lb.; flake, 9½d. to 9¾d.

α-NAPHTHYLAMINE.—Lumps, 1s. per lb.; ground, 1s. 0½d. in casks.

β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb., d/d buyer's works.

NEVILLE AND WINTHER'S ACID.—Spot, 3s. per lb. 100%.

o-NITRANILINE.—3s. 11d. per lb.

m-NITRANILINE.—Spot, 2s. 7d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 8d. to 2s. 1d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 4½d. to 5d. per lb., in 90-gal. drums, drums extra. 1-ton lots d/d buyer's works.

NITRONAPHTHALENE.—9½d. to 10d. per lb.; P.G., 1s. 0½d. per lb.

SODIUM NAPHTHONATE.—Spot, 1s. 9d. per lb., 100% d/d buyer's works.

SULPHANILIC ACID.—Spot, 8d. per lb. 100%, d/d buyer's works.

o-TOLUIDINE.—10½d. per lb., in 8/10-cwt. drums, drums extra.

p-TOLUIDINE.—1s. 10½d. per lb., in casks.

m-XYLIDINE ACETATE.—4s. 3d. per lb., 100%.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Bankruptcy Proceedings

(NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court Judgments against him.)

ELECTRO CHEMICAL PROCESSES, LTD.—Notice is given that the creditors of the above-named Company are required, on or before the 11th day of December, 1937, to send in their names and addresses, with particulars of their debts or claims, to Albert Edward Dunnill, of 113 Kingsway, London, W.C.2, the liquidator of the said Company.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

BROWN AND DEIGHTON, LTD., Preston, oil manufacturers, etc. (M.S., 4/12/37.) November 18, £10,000 further charge (inclusive of £7,500 already registered) to W. Duckworth, Ribby-with-Wrea, and others; charged on properties at Preston and Hutton. *£7,500. March 10, 1937.

Satisfactions

ACME SOAP CO., LTD., Manchester. (M.S., 4/12/37.) Satisfaction November 20, of debentures registered June 23, 1937, to extent of £250.

SPOONER AND BAILEY, Eling, chemical manufacturers. (M.S., 4/12/37.) Satisfaction, November 17, of three mortgages, registered December 5, 1923.

New Companies Registered

Bertram Harrington and Co., Ltd. (333,250).—Private company. Capital, £500 in 500 ordinary shares of £1 each. To carry on the business of wholesale and retail chemists, and druggists, chemical engineers, sterilisers, etc. Subscribers: Louis B. Cowan, 9 Lytton Close, Finchley, N.2; Ella V. Barnes, 21 Wingate Road, Ravenscourt Park, W.6. Solicitors: L. A. Finklestone and Co., 31 Budge Row, E.C.4.

J. Ramage & Co., Ltd. (333,087).—Private company. Capital £200 in 200 shares of £1 each. To carry on the business of manufacturers of and dealers in chemicals, gases, drugs, medicines, plaster of paris, gypsum, plasters, disinfectants, etc. Directors: John Ramage, 340 Southcroft Road, S.W.16; Isabella A. Wylie, 297 Selly Road, S.W.17. Registered Office: 67 Peckham Rye, S.E. 15.

The Langloan Iron, Cement and Chemical Co., Ltd.—Registered in Edinburgh as a "public" company. Nominal capital, £100 in 1,000 shares of 2s. each. To acquire the property and assets formerly owned by the Langloan Iron and Chemical Co., Ltd., and to carry on the business of ironmasters, iron and steel manufacturers, founders and workers in brass, iron, steel and other metals, engineers, cement and chemical manufacturers, etc. Subscribers: D. M. Baird and J. W. Gibson, both of Commercial Bank Buildings, Cupar, and 5 others.

Orcene Products, Ltd. (333,287). Private company. Capital, £10,000 in 10,000 shares of £1 each. To carry on the business of manufacturers of and dealers in astringents, detergents, wetting, stabilising and fixing agents, chemical goods, water softening and bleaching agents, and all cleansing and purifying agents, and preparations suitable for use in bleaching, printing, dyeing, cleaning, and treatment of textile, and all kinds of fabrics, metals, and other materials, etc. Subscribers: Raymond J. L. Fish, 45 Linden Gardens, W.2; Adrian D. Holroyd, 18 Lloyd Park Avenue, Croydon. Solicitors: Beardall, Fenton and Co., 10 George Street, Hanover Square, W.1.

Alfred Nightingale and Sons, Ltd.—Private company. Capital, £15,000 in 15,000 ordinary shares of £1 each. To acquire the business of a manufacturer of and dealer in fertilisers and agricultural and horticultural products now carried on by Alfred Nightingale at Duck Mill Lane, Bedford, as "Alfred Nightingale and Sons." Directors: Alfred Nightingale (managing and governing director and chairman), 10 Cardington Road, Bedford; Alfred J. Nightingale, 244 Amptill Road, Kempston, Beds.; Geo. Nightingale, 3 Ouse Road, Goldington, Bedford; Harold W. Nightingale, 11 Kingsbrook Road, Bedford. Solicitor: John G. Langley, 8 St. Paul's Square, Bedford.

Company News

B. Laporte, Ltd., chemical manufacturers, announce an interim of 5 per cent., less tax (same).

J. C. and J. Field, soap manufacturers, announces interim on preference shares at rate of 7 per cent. per annum, less tax, in respect of half-year ended September 30, payable December 14.

Broom and Wade, Ltd., manufacturers of air compressors, announce a final dividend of 10 per cent., less tax, for the year ended September 30. Interim dividends of 7½ per cent., and 5 per cent., less tax, have already been paid during the financial year.

Sulphide Corporation, Ltd., is doubling its ordinary dividend for the year to June 30 last at 10 per cent., less tax. Payment will be made on December 21. Last year's dividend of 5 per cent., compared with 2½ per cent. for 1934-35. A dividend of 10 per cent. on the preference shares is also announced.

Simpson and Godlee, Ltd., cotton manufacturers and calico printers, announces profit for year to September 30 last, £20,307 (against £4,816); after adding balance forward from last year of £68,254 and deducting debit of profit and loss account of subsidiary company at October 3, 1936, amounting to £20,633, balance is £67,919, which is carried forward.

William Briggs and Sons, chemical manufacturers, etc., in their report for year ended September 30, shows, after meeting all expenses, including managing directors' remuneration on fixed assets, that profits were £55,071. A final dividend of 7½ per cent., making 12½ per cent., less tax (last year dividend at rate of 10 per cent. per annum paid for period of 10½ months) was announced.

Brown, Bayley's Steel Works, Ltd., in their report for the year ended July 31, show that net profits for the period rose from £123,542 to £138,368. Payment of dividends on the preference shares has been brought up to date, and a dividend of 10 per cent., tax free, has been declared on the ordinary shares. A sum of £25,000 is transferred to general reserve, and a similar amount to reserve for obsolescence of buildings, plant and machinery. These allocations are the same as at this time a year ago. Carry-forward is increased from £20,124 to £28,492.

British Benzol and Coal Distillation, Ltd., announce a maiden dividend of 10 per cent. and a bonus of 2½ per cent., making 12½ per cent., less tax, for the year to October 31, 1937. Formed in 1928, the company's capital was reorganised last year, and now comprises £125,000 in ordinary shares of £1.

The Shell Union Oil Corporation has declared a further dividend of 50c. per share on the common stock, payable on December 20, to holders on record at December 9. This makes, with the interim, a total of \$1 per share for 1937, compared with 25c. for 1936, when dividends were resumed after a lapse of five years.

The British Tyre and Rubber Co., Ltd., show a further advance in net profits from £123,177 to £135,186. Gross profits, including dividends from subsidiaries, are £31,403 higher at £229,940. The total distribution on the £900,000 ordinary capital is repeated at 10 per cent., less tax, including a bonus of 2 per cent.; £25,000 is again placed to reserve, and after writing £12,500, against £11,765, off goodwill, trade marks, the carry-forward is increased from £36,076 to £49,134.

The United Molasses Co., Ltd., in a preliminary statement, show that consolidated profits of the company and its subsidiaries for the year ended September 30, 1937, after providing for directors' fees, management expenses, full taxation on the year's profits, and all other charges, amount to £946,241. This is an increase of £187,197 on the 1935-36 figure of £759,044, which, in turn, was £40,844 more than in 1934-35. At £318,101, the amount allowed for depreciation is slightly higher than in the previous year. This leaves £628,140 available for dividends. The amount earned in the previous year (after charging £56,298 interest on debentures since redeemed) was £399,068. Ordinary stock, £1,940,500 of which is in issue in units of 6s. 8d., receives a total dividend of 21½ per cent., compared with 14 per cent. The interim was 6½ per cent., and the final 15 per cent., less tax. General reserve is credited with £225,000, against £110,000 in 1935-36, and £37,000, compared with £20,000, is placed to superannuation funds. These allocations leave a balance of £49,634 to go forward, against £49,480 brought in.

